

TECHNICAL MANUAL

OPERATOR'S, UNIT, AND INTERMEDIATE DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

RECEIVER-TRANSMITTER RT-1539(P)A(C)/G

(NSN 5820-01-247-9118)

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1 MARCH 1989

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No. 4

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Washington, DC 1 March 1995

**Operator's, Unit, and Intermediate Direct
Support Maintenance Manual
Including
Repair Parts and Special Tools List**

**RECEIVER-TRANSMITTER
RT-1539A(P)(C)/G
(NSN 5820-01-247-9118)
(EIC: N/A)**

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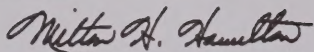
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**Operator's, Unit, and Intermediate Direct
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No. 2

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Including Repair Parts and Special Tools List
RECEIVER-TRANSMITTER RT-1539(P)A(C)/G
(NSN 5820-01-247-9118)**

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**Operator's, Unit, and Intermediate Direct
Support Maintenance Manual
Including
Repair Parts and Special Tools List**

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SAFETY STEPS TO FOLLOW IF SOMEONE
IS THE VICTIM OF ELECTRICAL SHOCK

1

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2

IF POSSIBLE, TURN OFF THE ELECTRICAL
POWER

3

IF YOU CANNOT TURN OFF THE ELECTRICAL
POWER, PULL, PUSH, OR LIFT THE PERSON TO
SAFETY USING A DRY WOODEN POLE OR A DRY
ROPE OR SOME OTHER INSULATING MATERIAL

4

SEND FOR HELP AS SOON AS POSSIBLE

5

AFTER THE INJURED PERSON IS FREE OF CON-
TACT WITH THE SOURCE OF ELECTRICAL
SHOCK, MOVE THE PERSON A SHORT
DISTANCE AWAY AND IMMEDIATELY START
ARTIFICIAL RESUSCITATION. REFER TO FM 21-11



CAUTION



**THIS EQUIPMENT CONTAINS PARTS
AND ASSEMBLIES SENSITIVE TO
DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).
USE ESD PRECAUTIONARY PROCEDURES
WHEN TOUCHING, REMOVING OR INSERTING
PRINTED CIRCUIT BOARDS.**

ESD CLASS 1

GENERAL HANDLING PROCEDURES FOR ESDS ITEMS

- USE WRIST GROUND STRAPS OR MANUAL GROUNDING PROCEDURES
- KEEP ESDS ITEMS IN PROTECTIVE COVERING WHEN NOT IN USE
- GROUND ALL ELECTRICAL TOOLS AND TEST EQUIPMENT
- PERIODICALLY CHECK CONTINUITY AND RESISTANCE OF GROUNDING SYSTEM
- USE ONLY METALIZED SOLDER SUCKERS
- HANDLE ESDS ITEMS ONLY IN PROTECTED AREAS

MANUAL GROUNDING PROCEDURES

- MAKE CERTAIN EQUIPMENT IS POWERED DOWN
- TOUCH GROUND PRIOR TO REMOVING ESDS ITEMS
- TOUCH PACKAGE OF REPLACEMENTS ESDS ITEM TO GROUND BEFORE OPENING
- TOUCH GROUND PRIOR TO INSERTING REPLACEMENT ESDS ITEMS

ESD PROTECTIVE PACKAGING AND LABELING

- INTIMATE COVERING OF ANTISTATIC MATERIAL WITH AN OUTER WRAP OF EITHER TYPE 1 ALUMINIZED MATERIAL OR CONDUCTIVE PLASTIC FILM - OR - HYBRID LAMINATED BAGS HAVING AN INTERIOR OF ANTISTATIC MATERIAL WITH AN OUTER METALIZED LAYER
- LABEL WITH SENSITIVE ELECTRONIC SYMBOL AND CAUTION NOTE

WARNING**HIGH VOLTAGE**

High voltage is used in this equipment. Be careful when working near the interior of the equipment or near the ac power distribution. Observe warning notes in this technical manual and warning decals on equipment. Death on contact may result if safety precautions are not observed.

WARNING**DANGEROUS VOLTAGE**

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is also competent in administering first aid. When the technicians are aided by operators, they must be warned about dangerous areas. Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

For artificial respiration refer to FM 21-11

CAUTION**STATIC ELECTRICITY**

Printed circuit cards contain Metal Oxide Semiconductor (MOS) devices which can be damaged by static electrical discharge due to handling. Cards must be kept in special conductive plastic bags and removed only when transferring to use in the switchboard. Momentarily touch a bare hand to a grounded metal surface and handle cards by edges only to avoid transfer of charge from body to the MOS device. Avoid body or hand contact with pins of module or other connectors. Use static protective shipping material to package and return failed items to the Defense Reutilization and Marketing Office (DRMO) for appropriate disposal.

WARNING

BA-5372/U Lithium Manganese Dioxide battery must not be abused in any way which may cause it to rupture:

DO NOT heat, short circuit, crush, puncture, mutilate, open, or disassemble battery.

DO NOT use any battery which shows signs of damage (bulging, swelling, disfigurement, brown liquid in wrap, swollen wrap, etc.), and **DO NOT** use any battery that does not fit tight in battery compartment of equipment.

DO NOT recharge battery.

DO NOT test battery for capacity without using an approved testing device.

Prior to **ALL** battery disposal actions, coordinate with local environmental office/officer to ensure compliance with all federal, state, and local solid waste regulations. The battery should be disposed of through the local servicing Defense Reutilization and Marketing Office (DRMO).

The only acceptable replacement for the BA-5372/U Lithium Manganese Dioxide battery is another BA-5372/U. **DO NOT** use any other battery for replacement.

CAUTION

Prior to **ALL** battery disposal actions, coordinate with local environmental office/officer to ensure compliance with all federal, state, and local solid waste regulations. Batteries should be disposed of through the local servicing DRMO.

DO NOT test batteries for capacity without using an approved testing device.

DO NOT use any lithium battery that does not fit tightly in battery compartment of equipment.

ONLY use batteries that have been authorized for this equipment.

CAUTION

DO NOT dispose of batteries with ordinary trash/refuse. Turn in batteries to your local-serving Defense Reutilization and Marketing Office (DRMO).

ONLY use batteries that have been authorized for this equipment.

WARNING

The RT-1539 weighs 88 pounds (40 kilograms). To avoid injury, two people are required to move the unit.

WARNING

If the battery compartment becomes hot to the touch, or if you hear a hissing sound (i.e., battery venting), or smell irritating sulfur dioxide gas, **IMMEDIATELY** Turn Off the equipment. Remove the equipment to a well ventilated area or leave the area.

TECHNICAL MANUAL

No. 11-5820-1027-13&P

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DEPARTMENT OF THE ARMY
Washington, DC, 1 March 1989

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RECEIVER-TRANSMITTER RT-1539A(P)(C)/G

(NSN 5820-01-247-9118)
(EIC: N/A)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007.

A reply will be furnished directly to you.

*This manual supersedes TM 11-5820-1027-13&P, 19 January 1988.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1 SCOPE.

This manual describes the Receiver-Transmitter RT-1539A(P)(C)/G, hereafter referred to as the RT-1539, and contains instructions for the installation, operation, maintenance, operator maintenance, unit level maintenance, and intermediate direct support level maintenance of the equipment.

1-2 CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3 MAINTENANCE FORMS, RECORDS AND REPORTS.

1-3.1 Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update.

1-3.2 Reporting of Item and Packaging Discrepancies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

1-3.3 Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your RT-1539 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ED-CFO, Fort Monmouth, New Jersey 07703-5023. We'll send you a reply.

1-5 ADMINISTRATIVE STORAGE.

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the Preventive Maintenance Checks and Services (PMCS) charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness.

1-6 DESTRUCTION OF ARMY ELECTRONIC MATERIEL.

Destruction of Army electronic materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-7 WARRANTY INFORMATION.

Refer to TB 11-5800-216-35 for information concerning equipment warranties.

1-8 NOMENCLATURE CROSS-REFERENCE LIST.

Table 1-1 is a cross-reference list of common names and official nomenclature for equipment described in this manual. Official nomenclature must be used when completing report forms.

Table 1-1. Nomenclature Cross-Reference List

COMMON NAME	OFFICIAL NOMENCLATURE
Battery	BA-1318/U
HVA-9	High Voltage Assembly Y43322
MCU	Voice and Data Encryption Device MO-3/C
RT-1539	Receiver-Transmitter RT-1539A(P)(C)/G

Section II. EQUIPMENT DESCRIPTION AND DATA**1-9 PURPOSE AND USE.**

The Receiver-Transmitter RT-1539A(P)(C)/G (fig. 1-1) is a Very High Frequency (VHF) Frequency Modulation (FM) transceiver designed for use in the MSE system. It allows encrypted radio transmissions between subscribers up to 8.5 miles (15 km) apart. The RT-1539 operates in a full-duplex mode with high and low frequency bands containing transmit and receive channels. It ensures digitizing and encryption of transmitted and received data, and communicates with any telephone terminal compatible with 16 kb/s, diphase signals. It has two modes of operation; Radio Access Unit (RAU) mode and Mobile Subscriber Radio Terminal (MSRT) mode.

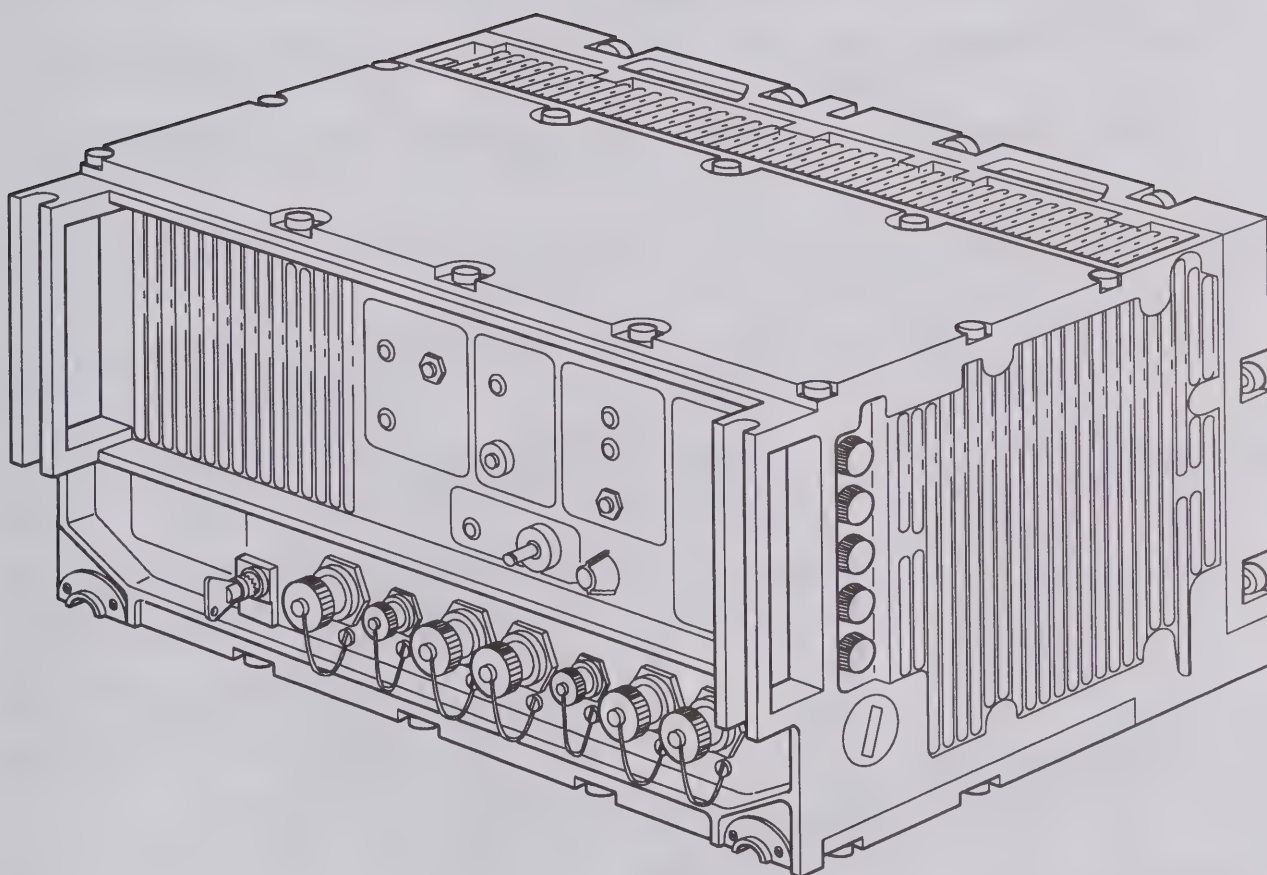
In the RAU mode, the RT-1539 is under control of the Group Logic Unit. In the MSRT mode, the RT-1539 is operated as a mobile radio/telephone terminal.

1-10 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

1-10.1 General Description. The RT-1539 provides a means of secure communication transmission and reception. The subassemblies of the RT-1539 are illustrated in figure 1-2. These subassemblies work together to provide secure communications and an operational status indication for the RT-1539. The fuses and battery compartment have access on the side panel for ease of replacement. Located on the opposite side panel is the decompression screw, which is only used for shipping purposes. The subassemblies of the RT-1539 are:

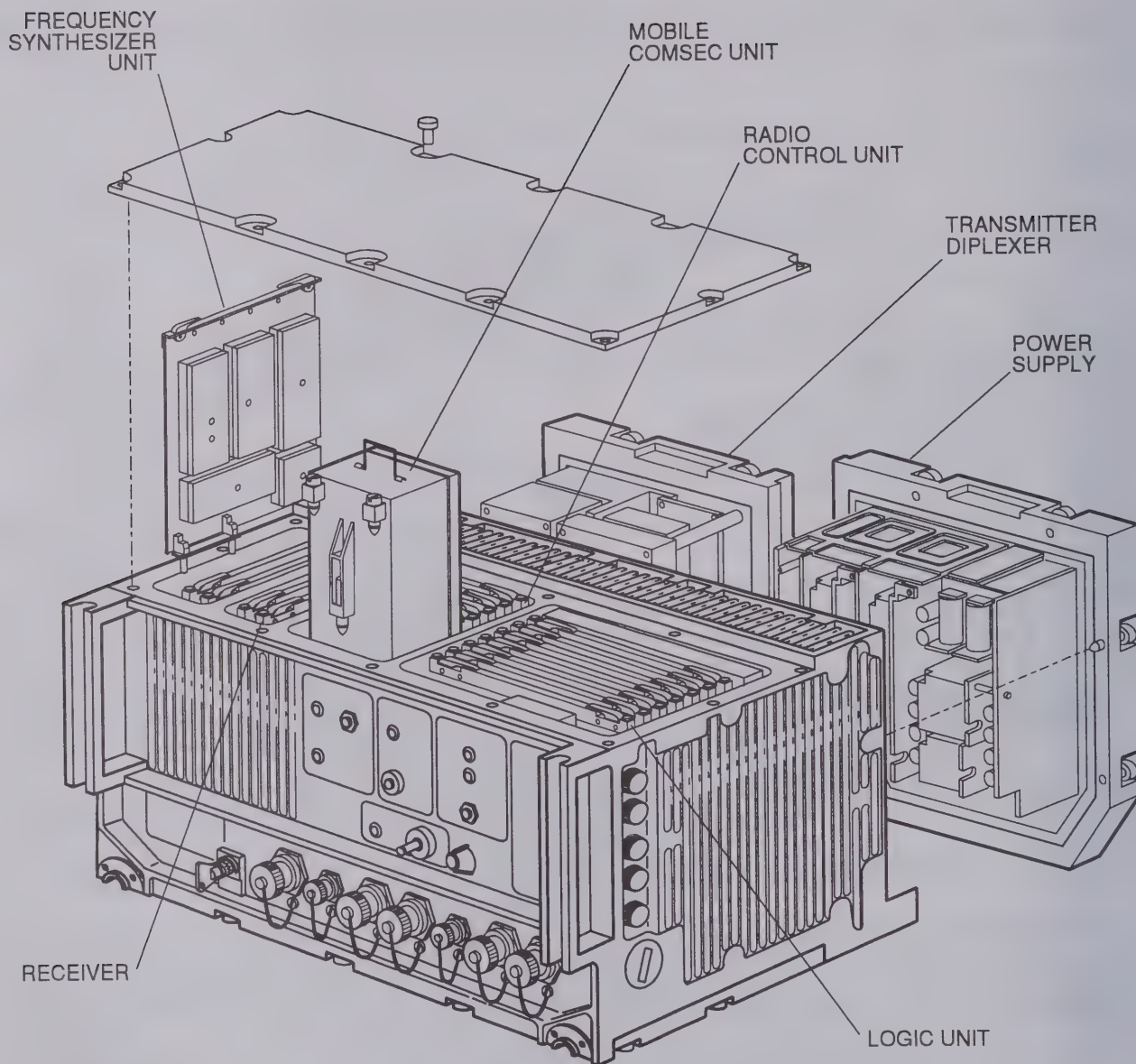
- Receiver
- Frequency synthesizer unit
- Radio control unit
- Transmitter-duplexer
- Power supply
- Logic unit
- Mobile COMSEC unit.

1-10.2 Receiver. The receiver accepts Radio Frequency (rf) signals from the antenna. It then adjusts the sensitivity accordingly and processes the RF signal. The processed signal is passed to the radio control unit.



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■ Figure 1-1. Receiver-Transmitter RT-1539A(P)(C)/G



CE1ME002

Figure 1-2. RT-1539 Subassemblies

1-10.3 Frequency Synthesizer Unit. The frequency synthesizer unit generates all of the reference frequencies that are used throughout the RT-1539.

1-10.4 Radio Control Unit. The radio control unit is the interface between the front panel controls and indicators, logic unit, transmitter-duplexer, receiver, and synthesizer subassemblies.

1-10.5 Transmitter-Duplexer. The transmitter-duplexer provides the RF output carrier and differentiates between the upper and lower bands for full-duplex operation. It also samples the direct and reflected power to control the output power level.

1-10.6 Power Supply. The power supply provides all of the voltages required throughout the RT-1539 from a single input power source. It also protects against any mismatching of the output circuits.

1-10.7 Logic Unit. The logic unit contains a microprocessor that provides centralized control of RT-1539 functions. It also contains the firmware required for running the Built-In Test (BIT).

1-10.8 Mobile COMSEC (Communications Security) Unit. The Mobile COMSEC Unit (MCU) provides encryption, when loaded with a key, for both voice and data.

1-10.9 Peripheral Equipment. Peripheral equipment provided for RT-1539 operation includes the ground rod assembly, whip or mast-mounted omnidirectional antenna, universal power supply, the high voltage assembly, the digital secure voice terminal (DSVT), and the electronic transfer device KYK-13/TSEC.

1-10.10 Antenna. A whip or mast-mounted omnidirectional antenna is provided for the RT-1539. The whip antenna mounts to a vehicle mounting bracket. The omnidirectional antenna is mounted atop a 15- or 30-meter mast.

1-10.11 Universal Power Supply. The Universal Power Supply (UPS) is part of the stand-alone configuration and supplies operating power to the RT-1539. This power is in the form of a voltage whose value can vary from +21 to +33 Vdc.

1-10.12 High Voltage Assembly (HVA-9). The RT-1539 installation HVA-9 system is used in the stand-alone configuration and in the universal vehicle configuration. The HVA-9 provides overload protection for the antenna and RT-1539 signal input circuits.

1-11 TABULATED DATA.

Table 1-2 lists the physical data and performance characteristics.

Table 1-2. Tabulated Data

WEIGHTS AND DIMENSIONS

Dimensions

Length	14.8 in. (376 mm)
Height	10.2 in. (259 mm)
Width	20.6 in. (523 mm)

Weight	88 lb (40 kg) (without MCU)
--------	-----------------------------

POWER REQUIREMENTS

Power supply	+21 to +33 Vdc
--------------	----------------

Table 1-2. Tabulated Data – Continued

Levels of High Frequency Power

N0	16 W nominal
N1	3 W nominal
N2	0.5 W nominal

Power drain

Standby affiliated	50 W maximum
At full RF power	200 W maximum

Antenna

Frequency range	30 to 88 MHz
Impedance	50 ohms

Frequency bands

CONUS mode	30 to 35 MHz and 40 to 50 MHz
OCONUS mode	30 to 51 MHz and 59 to 88 MHz

<u>Harmonic frequency suppression</u>	35 dB minimum
---------------------------------------	---------------

<u>Telephone conditions</u>	Panel standard line 16 kb/s data rate, diphas coaxial, maximum length: 656 ft (200 m)
-----------------------------	--

<u>Radio range</u>	10 miles (18 km) nominal
--------------------	--------------------------

ENVIRONMENTAL REQUIREMENTS

	<u>Operation</u>	<u>Storage and transit</u>
Temperature	-40° to +130°F (-40° to 55°C)	-70° to 160°F (-56° to 70°C)
Altitude	Sea level to 40,000 ft (12,192 m)	Sea level to 10,000 ft (3,048 m)
Relative humidity	5% to 95%	5% to 95%
<u>Acoustical noise</u>	Less than 75 dB (all equipment operating, including ECU)	N/A

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1 UNPACK EQUIPMENT.

WARNING

The RT-1539 weighs 88 pounds (40 kilograms). To avoid injury, two people are required to move the unit.

CAUTION

Do not lay equipment on its side when handling or carrying or equipment might be damaged.

The RT-1539 is packed in a double-walled corrugated carton surrounded by pre-cut, medium-diameter, open-cell polyurethane cushioning. No special unpacking instructions are required.

2-2 INSPECT EQUIPMENT FOR DAMAGE.

Inspect equipment for damage that may have occurred during shipment. If equipment has been damaged, report damage on SF 364, Report of Discrepancy.

2-3 CHECK EQUIPMENT AGAINST PACKING LIST.

Check equipment against packing list to see if shipment is complete. Report any discrepancies by filling out Transportation Discrepancy Report (TDR) Form SF 361 as prescribed in AR 55-38.

2-4 CHECK EQUIPMENT FOR MODIFICATIONS.

Current Modification Work Orders (MWOs) are listed in DA Pam 25-30. Check MWO number on the front panel near the nomenclature plate. Verify that all modifications have been made. If modifications have not been made, refer to next higher level of maintenance.

Section II. INSTALLATION INSTRUCTIONS

2-5 TOOLS AND MATERIALS REQUIRED.

Table 2-1 lists tools and materials required for installation.

2-6 INSTALLATION INSTRUCTIONS.

CAUTION

To avoid damage to equipment, ensure that radio is at least 2 inches from shelter wall to permit adequate air circulation.

2-6.1 General. The RT-1539 is installed on shock mounts, in most cases, to enable the RT-1539 to withstand shocks and vibrations. However, in the case of the MSRT stand-alone field kit, mounting not required.

Table 2-1. Tools and Material Required for Installation

ITEM	PURPOSE
3/8-in. slot screwdriver	Remove and replace battery compartment cap

2-6.2 Battery Installation. Perform the following procedure to install the battery (fig. 2-1).

WARNING

DO NOT USE any battery that shows signs of damage, such as bulging, swelling, disfigurement, , a swollen plastic wrap, etc.

- a. Using 3/8-in. flat tip screwdriver, remove battery compartment cap.

CAUTION

To prevent equipment damage, use only BA-1318/U type battery. Ensure plus (+) and minus (-) terminals are correctly placed.

- b. Install battery in battery compartment cap.
- c. Using 3/8-in. flat tip screwdriver, replace battery compartment cap.

2-6.3 Cable Connections. Perform the following procedure to connect RT-1539 cable (fig. 2-2).

- a. Install RT-1539 as required for tactical situation (para 2-6.1).
- b. Connect ground strap to RT-1539 ground connector.

WARNING

Voltages as high as +56 Vdc can be encountered at end of cables. Personal injury can result.

- c. Connect antenna coaxial cable to RT-1539 ANTENNA connector.
- d. Connect telephone device cable to RT-1539 TELEPHONE connector.
- e. Connect power source cable to RT-1539 24V connector.
- f. Perform preliminary checks (para 2-7) before operating equipment.

2-7 PRELIMINARY CHECKS.

Perform the following checks and adjustments (figs. 2-1 and 2-2).

- a. Ensure that decompression screw is tightened securely.
- b. Ensure OFF/BLACK OUT/ON switch is at OFF.

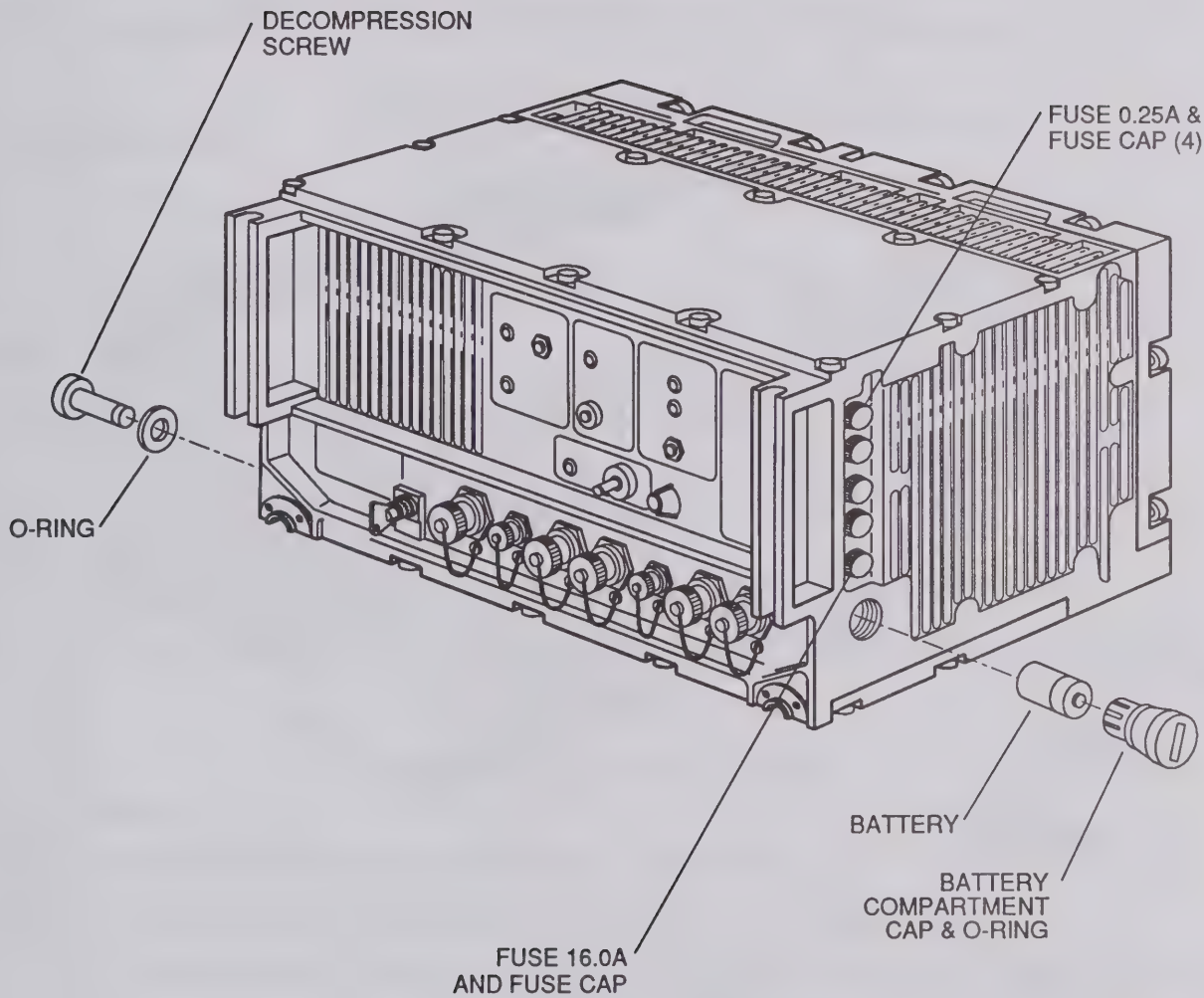


Figure 2-1. RT-1539 Battery Compartment, Decompression Screw and Fuse Locations

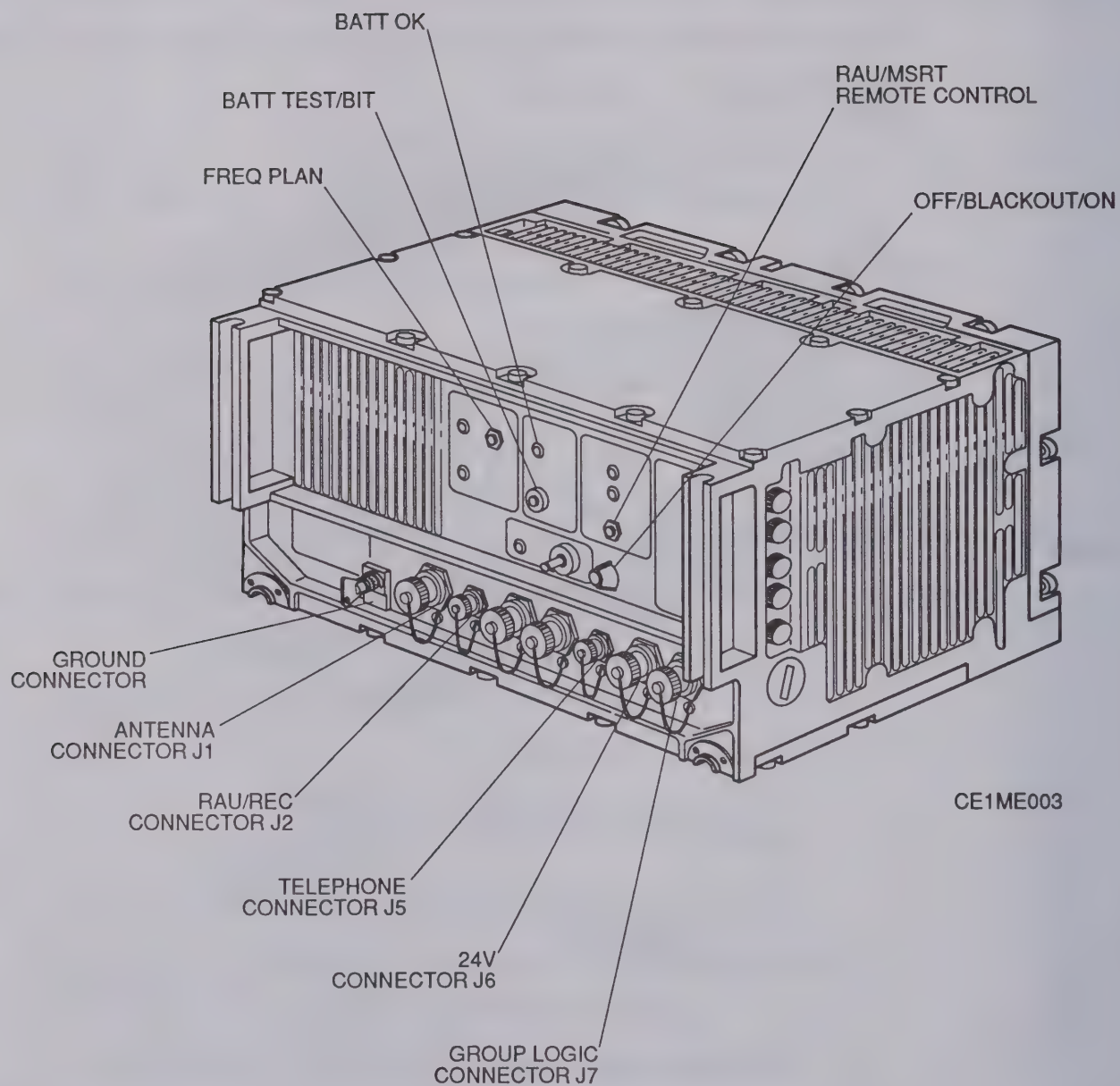


Figure 2-2. RT-1539

- c. Set RAU/MSRT/REMOTE CONTROL switch at position corresponding to mode of operation (RAU, MSRT, or REMOTE CONTROL).
- d. Set FREQ PLAN switch at NETWORK or RADIONET.
- e. Ensure battery is installed. Refer to paragraph 2-6.2 for battery installation.
- f. Perform the following steps to test battery.

NOTE

The RT-1539 must be turned off for at least 20 seconds before battery test can be performed.

The battery test circuit is powered by the battery. Perform battery test only as required to minimize battery drain.

- (1) Press and hold BATT TEST/BIT pushbutton (fig. 2-2).
- (2) Observe BATT OK indicator. If indicator is on, battery is OK. If indicator is not on, remove existing battery and install replacement battery (para 2-6.2).

2-8 EQUIPMENT SHUTDOWN.

2-8.1 With COMSEC Key Saved. Shut down RT-1539 as follows:

NOTE

DO NOT use remote power switch for normal system shutdown.

- a. Set OFF/BLACK OUT/ON switch (fig. 2-2) to OFF.
- b. Observe RT-1539 indicators. If all off, no action required. If any on, notify supervisor.

NOTE

The key and frequency plans are saved in memory.

2-8.2 Without COMSEC Key Saved. Shut down RT-1539 as follows:

- a. Set OFF/BLACKOUT/ON switch (fig. 2-2) to OFF.
- b. Observe indicators. If all off, no action required. Wait 20 seconds, if any on, notify supervisor.
- c. Unlock ZERO/FILL switch lever and set switch to ZERO and hold.
- d. Set FREQ PLAN switch to STOR.

2-9 PREPARATION FOR SHIPMENT.

The RT-1539 is packed in a shipping carton, surrounded by open-cell polyurethane material to protect against damage during movement.

- a. Perform equipment shutdown procedure (para 2-8.2).

WARNING

Ensure that all power to RT-1539 has been shut off to prevent shock hazard to personnel.

- b. Disconnect power source cable from RT-1539 24V connector.
- c. Remove cables from all RT-1539 connectors (fig. 2-2).
- d. Place protective covers on all connectors. Turn clockwise to fasten.
- e. Place protective covers on ends of disconnected cables.
- f. If mounted on shock mount tray, on front edge of tray, loosen two captive thumbscrews and disengage from two holddown pins on rear edge of RT-1539.
- g. Disconnect ground strap from RT-1539 ground terminal.
- h. If mounted on shock mount tray, slide RT-1539 forward to disengage two holddown pins from two holes in rear of RT-1539 cabinet.
- i. Loosen decompression screw and O-ring (fig. 2-1) for shipment by air only.
- j. Set FREQ PLAN switch (1, fig. 3-1) to STOR.
- k. Remove battery (para 5-12.3) and store or dispose of properly.

WARNING

The RT-1539 weighs 88 pounds (40 kilograms). To avoid injury, two people are required to move the unit.

- l. Gently position RT-1539 in shipping carton.
- m. Surround RT-1539 with precut, medium-diameter, open-cell polyurethane cushioning on all sides, top, and bottom.
- n. Close and seal carton.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATOR'S CONTROLS AND INDICATORS

3-1 DAMAGE FROM IMPROPER SETTINGS.

NOTE

When working on the RT-1539, observe all CAUTIONS and WARNINGS.

There are no operator control settings that will damage the electrical equipment in the RT-1539. However, there are precautions to be observed during installation and maintenance. A summary of dangers is listed in the front of this manual. Specific cautions and warnings are found in the procedures to which they apply. There are also warning labels on the equipment.

3-2 CONTROLS AND INDICATORS.

Figure 3-1 illustrates each control and indicator. Table 3-1 lists the controls and indicators of the RT-1539 and explains the function of each.

Section II. OPERATION UNDER USUAL CONDITIONS

3-3 PRELIMINARY STARTING PROCEDURES.

Preliminary checks are performed before powering up the equipment. These checks verify various switch positions (fig. 3-1). Before performing power initialization procedures, perform the following in the order given.

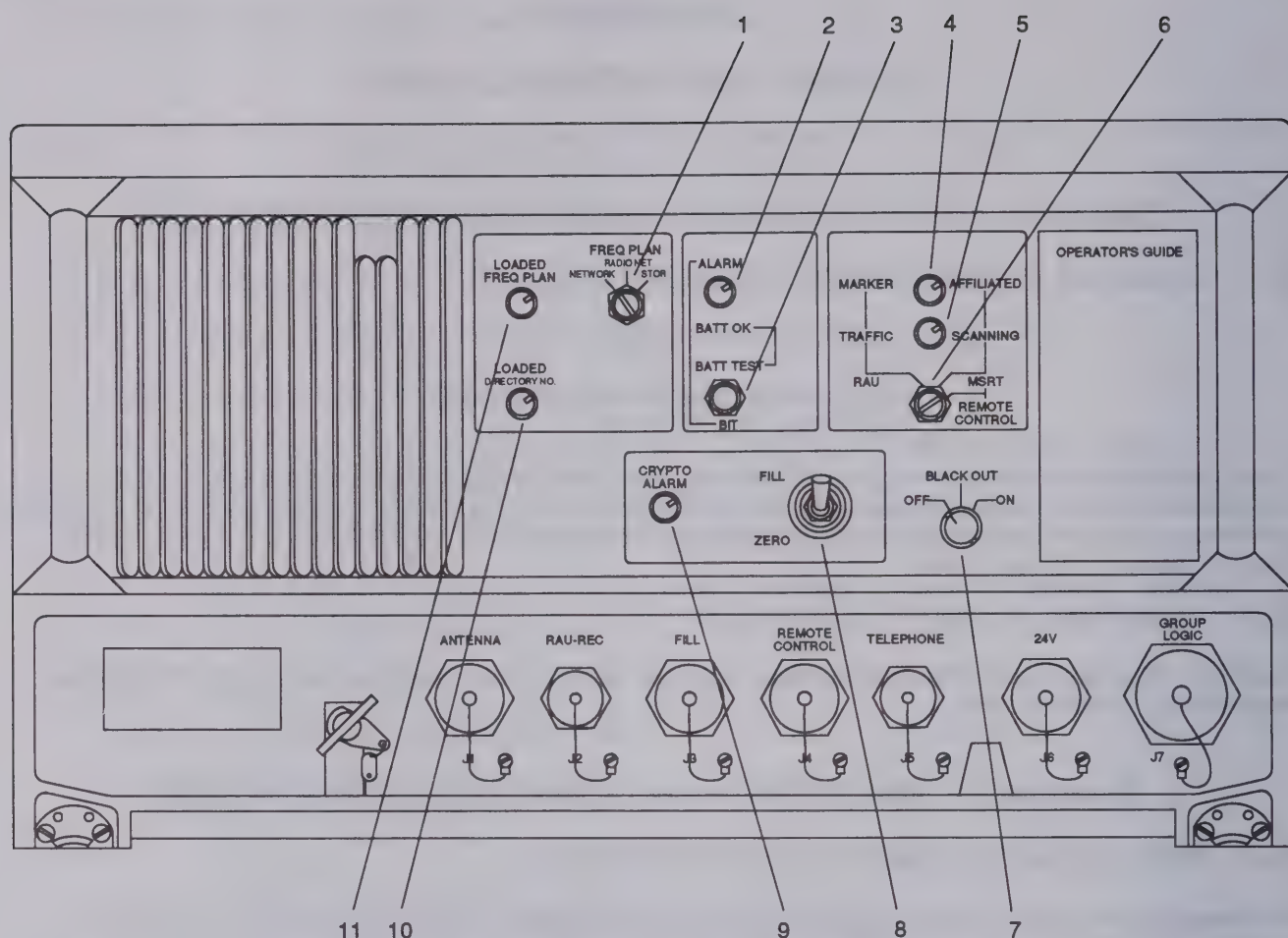
WARNING

Ensure prime power is off to prevent shock hazard to personnel.

- a. Check grounding of RT-1539 for firm connections and negligible resistance.
- b. Connect antenna coaxial cable to RT-1539 ANTENNA connector.
- c. Connect power source cable to RT-1539 24V connector.
- d. Connect telephone device cable to RT-1539 TELEPHONE connector.

3-4 INITIAL ADJUSTMENTS.

For initial checks and adjustments, refer to paragraph 2-7.



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Figure 3-1. RT-1539 Controls and Indicators

Table 3-1. RT-1539 Controls and Indicators

KEY	CONTROL OR INDICATOR	FUNCTION
1	FREQ PLAN	NETWORK - operates as MSRT
	NETWORK/RADIONET/ STOR switch	RADIONET - allows two types of calls: - direct MSRT-to-MSRT - operator calls
		STOR - used for long term storage
2	ALARM/BATT OK indicator	With the OFF/BLACK OUT/ON switch at ON: ON - indicates faulty operating condition OFF - indicates normal operating condition
		With OFF/BLACK OUT/ON switch at OFF: ON - indicates battery operational OFF - indicates battery not operational

Table 3-1. RT-1539 Controls and Indicators – Continued

KEY	CONTROL OR INDICATOR	FUNCTION	
3	BATT TEST/BIT pushbutton	Test indicates battery status when radio is turned off for more than 20 seconds. Runs built-in test when radio is on	
4	AFFILIATED/MARKER indicator	ON	- indicates affiliated with RAU
		OFF	- indicates not affiliated
		FLASHING	- indicates affiliated with presaturated RAU
5	TRAFFIC/SCANNING indicator	ON	- indicates in use for communications
			- final sequence of built-in test
		FLASHING	- indicates normal condition
6	RAU/MSRT/REMOTE CONTROL switch	Sets MSRT operating mode	
7	OFF/BLACK OUT/ON switch	ON	- turns radio power on
		BLACK OUT	- turns all indicators off
		OFF	- turns radio power off
8	ZERO/FILL switch	ZERO	- sets COMSEC key to zero when radio is powered on or off
		FILL	- loads COMSEC key
9	CRYPTO ALARM indicator	ON	- indicates COMSEC key not stored
		OFF	- indicates COMSEC key stored
		FLASHING	- indicates COMSEC key incompatibility with unit with which affiliation is being attempted
10	LOADED DIRECTORY NO. indicator	ON	- indicates directory number stored
		OFF	- indicates directory number not stored
11	LOADED FREQ PLAN	ON	- indicates frequency plan stored
		OFF	- indicates frequency plan not stored
		FLASHING	- indicates "virtual" frequency plan loaded

3-5 POWER INITIALIZATION.

Perform the following steps to initialize RT-1539.

NOTE

If radio should power up in an alarm state (ALARM/BATT OK indicator remains on), cycle OFF/BLACKOUT/ON switch OFF, then ON, rapidly. If alarm cannot be cleared in this manner, refer to specific troubleshooting information.

- a. Set OFF/BLACK OUT/ON switch at ON.
- b. Observe the following indicators. If not in the condition listed, refer to higher level maintenance.

- ALARM indicator - off. If on when powering-up, set OFF/BLACK OUT/ON switch from ON to OFF to ON quickly, indicator should be off
- CRYPTO ALARM indicator - (on or off when key is stored in the MCU)
- LOADED FREQ. PLAN indicator - off

NOTE

If the COMSEC key was saved when the RT-1539 was shut down previously, the LOADED FREQ PLAN indicator will be on.

- LOADED DIRECTORY NO. indicator - off
- SCANNING TRAFFIC indicator -off
- AFFILIATED MARKER indicator - off.

3-6 BIT.

3-6.1 BIT (Built-in Test). Perform the following procedures to test the operational status of the RT-1539. To perform BIT, the following equipment (in working condition) is required:

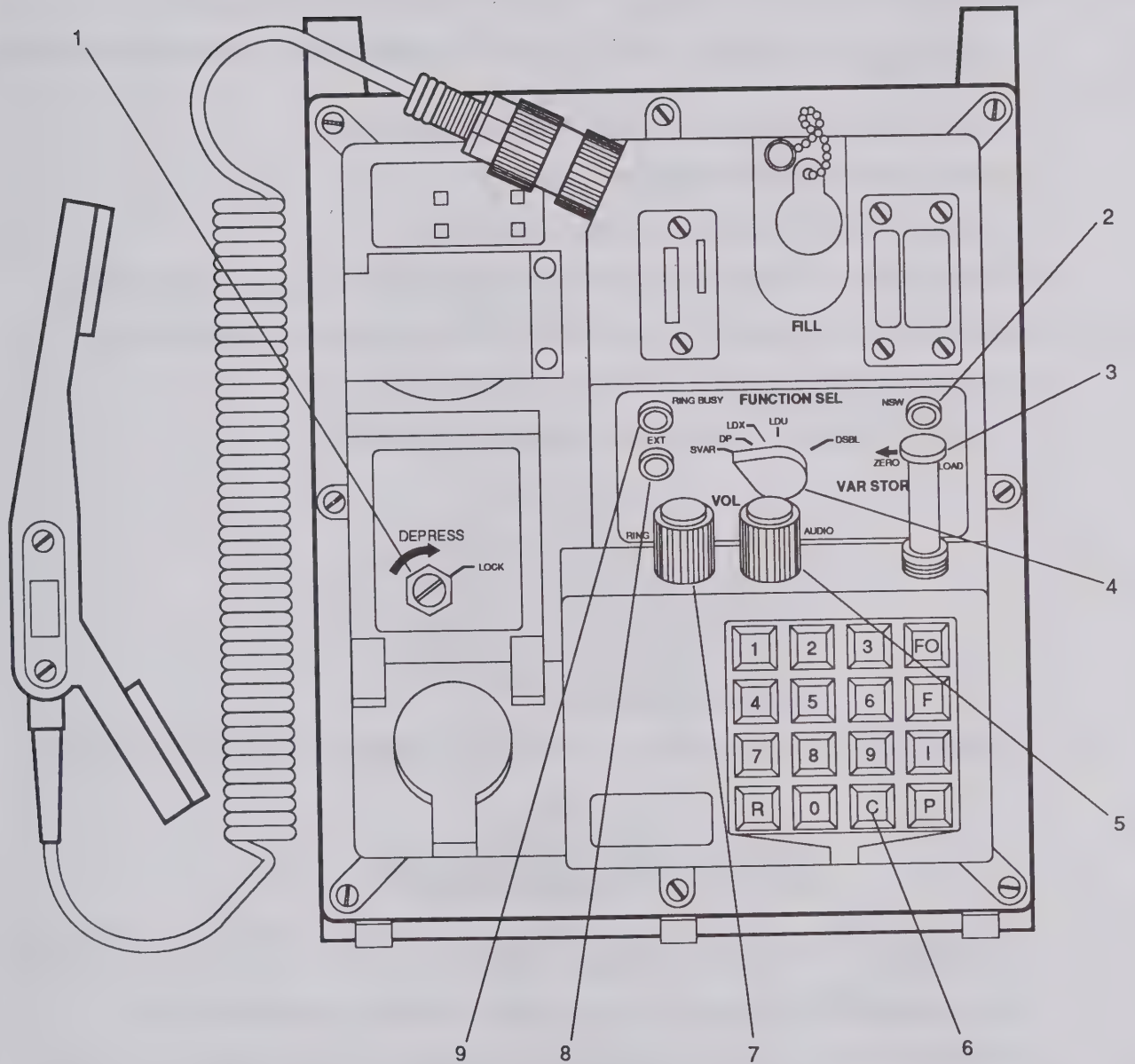
- DSVT
- KYK-13
- Whip antenna
- +24 Vdc power source (such as the universal power supply (UPS) from the mobile subscriber radio-telephone terminal (MSRT) stand-alone field kit)
- Interconnecting cables.

3-6.1.1 Front Panel Switch Settings. Set the front panel switches as follows:

NOTE

Ensure remote power switch (UPS power ON/OFF switch for stand alone field kit (SAFK) is at OFF).

- a. On RT-1539 (fig. 3-1).
 - (1) Set OFF/BLACK OUT/ON (7) at OFF.
 - (2) Set NETWORK/RADIONET/STOR (1) at NETWORK.
 - (3) Set RAU/MSRT/REMOTE CONTROL (6) at MSRT.
- b. On DSVT (fig. 3-2).
 - (1) Set FUNCTION SEL (4) at OP.
 - (2) Set DEPRESS/LOCK (1) at DEPRESS.



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Figure 3-2. DSVT Controls

- c. On KYK-13 (fig. 3-3).
 - (1) Set Z/ON/OFF CHECK (1) at OFF CHECK.
 - (2) Set 1/2/3/4/5/6/Z ALL (3) at 1.

3-6.1.2 Preliminary Checks and Switch Settings. Perform the following before starting testing.

- a. Press and hold RT-1539 BATT TEST/BIT (3, fig. 3-1) pushbutton. BATT OK illuminates to indicate battery is good.
- b. Set remote power switch (UPS POWER ON/OFF for SAFK) at ON.
- c. Set RT-1539 OFF/BLACK OUT/ON switch (7) at ON.
- d. Momentarily set RT-1539 FILL/ZERO switch (8) at ZERO.
- e. Observe CRYPTO ALARM indicator (9) illuminates to indicate the absence of COMSEC key.

3-6.1.3 Loading Keys Into the RT-1539. The keys are loaded using an encryption device (KYK-13).

- a. Remove protective cap from RT-1539 FILL connector J3 (5, fig. 3-4).
- b. Set KYK-13 Z/ON/OFF CHECK switch (1, fig. 3-3) to OFF CHECK.

CAUTION

To prevent damage to the RT-1539 fill connector, or to the fill device (for example the KYK-13), use the common fill cable. The only time the fill device should be connected directly to the RT-1539 is if the common fill cable is damaged and physical loading of a key is essential to the mission.

- c. Connect KYK-13 to the FILL connector of the RT-1539 using one of the following methods:

NOTE

The preferred method to connect fill device to the RT-1539 is with the common fill cable.

- (1) Connect KYK-13 connector J1 (1, fig. 3-5) to common fill cable. Connect other end of common fill cable to the RT-1539 FILL connector (5, fig. 3-4).
- (2) Connect KYK-13 connector P1 (2, fig. 3-5) to RT-1539 FILL connector (5, fig. 3-4).
- d. Set KYK-13 Z ALL/6,5,4,3,2,1 switch (3, fig. 3-3) to position containing M key to be transferred.
- e. Press and release KYK-13 initiate pushbutton (2) while observing parity indicator (4).
 - (1) If flashes, KYK-13 has good key ready to load. Continue to step f.
 - (2) If does not flash, notify supervisor.
- f. Set Z/ON/OFF CHECK switch (1) to ON.

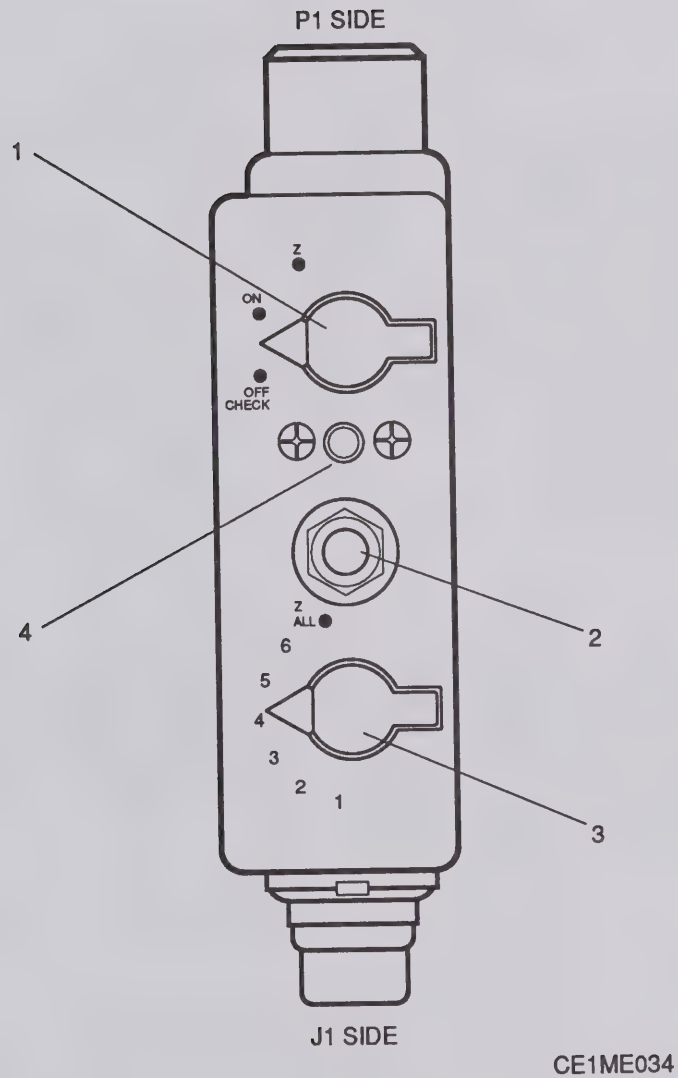


Figure 3-3. KYK-13 Controls

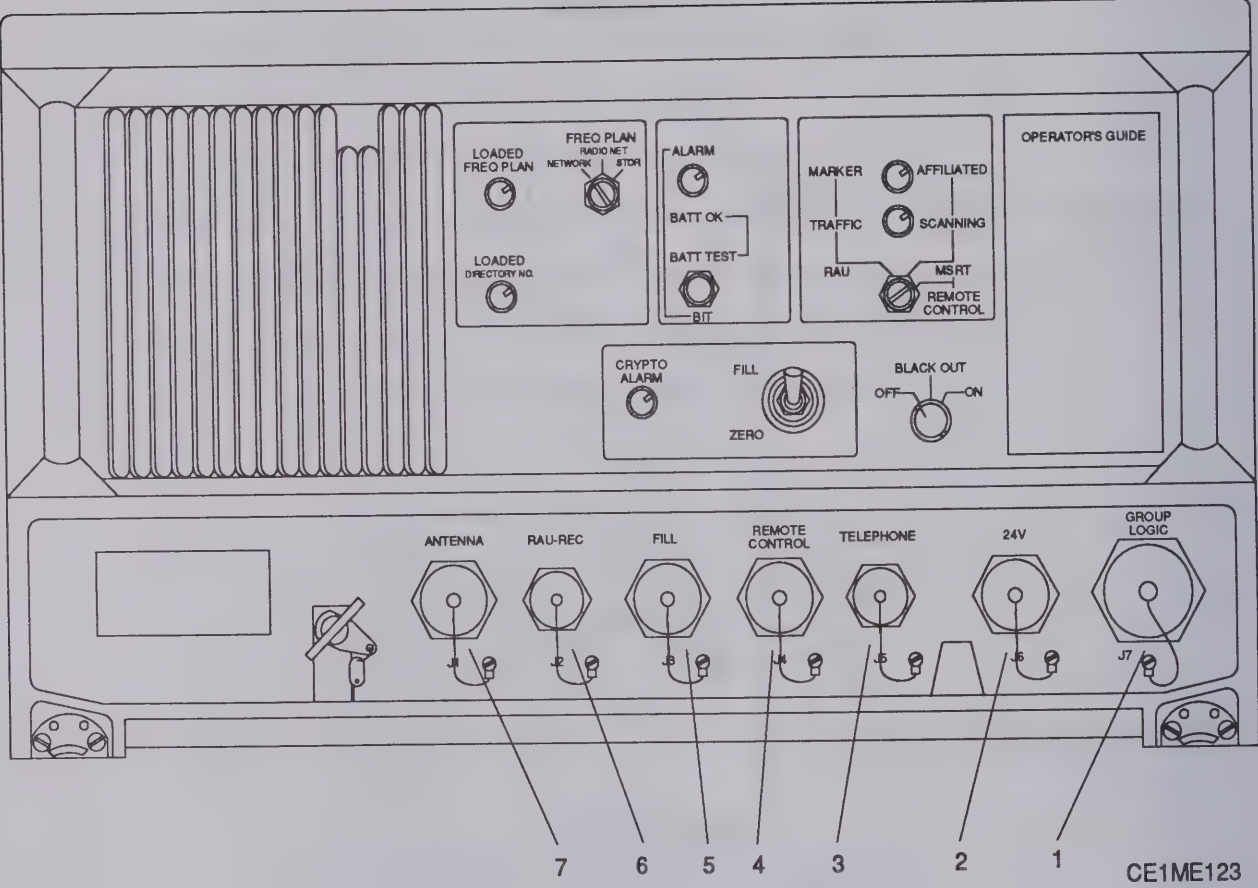
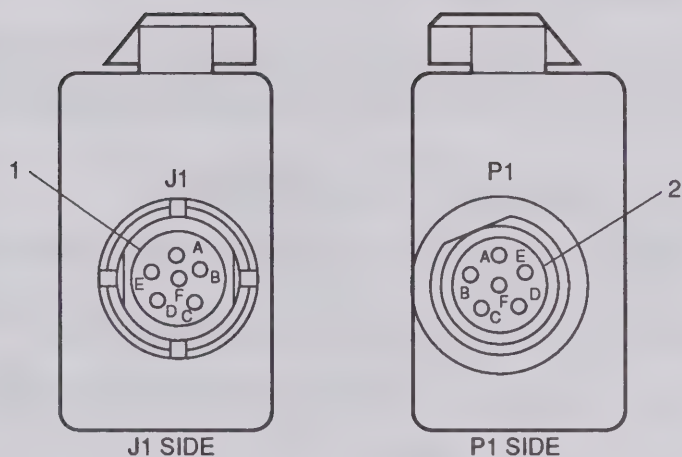


Figure 3-4. RT-1539 Connectors



(FOR CONNECTION
TO FILL CABLE)

(FOR DIRECT CONNECTION TO
EQUIPMENT: USE ONLY WHEN
FILL CABLE IS DAMAGED OR
DESTROYED AND REPLACEMENT
CABLE IS NOT AVAILABLE, OR
UNDER EMERGENCY CONDITIONS)

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Figure 3-5. KYK-13 Connectors

CAUTION

Do not press KYK-13 initiate pushbutton.

NOTE

COMSEC key loading will fail if the RT-1539 ZERO/FILL switch has been pressed more than three times. In case of key loading failure, set ZERO/FILL switch to ZERO once and reattempt key loading procedure.

- g. Press RT-1539 ZERO/FILL switch (8, fig. 3-1) from FILL to center position and return to FILL position four times in rapid succession. Observe CRYPTO ALARM indicator (9, fig. 3-1): off = loaded key; on = try another key. After all keys have been used and indicators are still on, fault is indicated. Notify supervisor.
- h. Set KYK-13 Z/ON/OFF CHECK switch (1, fig. 3-3) at OFF CHECK.
- i. Disconnect KYK-13 from RT-1539 using one of the following methods as determined by step c.
 - (1) Disconnect KYK-13 J1 connector (1, fig. 3-5) from common fill cable. Disconnect other end of common fill cable from RT-1539 FILL connector J3 (5, fig. 3-4).
 - (2) Disconnect KYK-13 P1 connector (2, fig. 3-5) from RT-1539 FILL connector J3 (5, fig. 3-4).

NOTE

After keys are loaded, DO NOT touch protective cap to connector pins.

- j. Reinstall protective cap on RT-1539 FILL connector J3 (5).

3-6.1.4 Loading Keys Into the DSVT. Keys are loaded by using an encryption device (KYK-13). The following procedure is used to load keys into DSVT.

- a. Remove protective cap from DSVT FILL connector (1, fig. 3-6).
- b. Set KYK-13 Z/ON/OFF CHECK switch (1, fig. 3-3) to OFF CHECK.

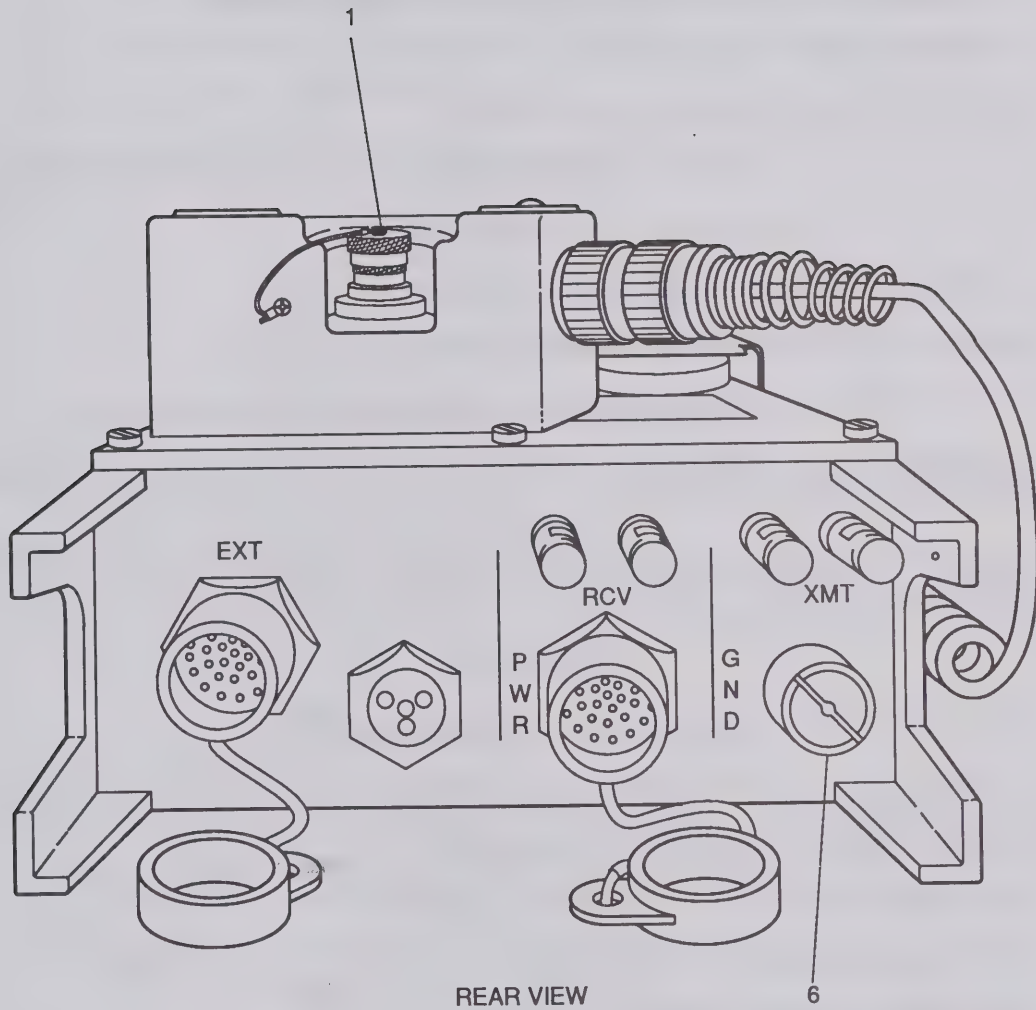
CAUTION

To prevent damage to the DSVT fill connector, or to the fill device (for example, the KYK-13), use the common fill cable. The only time the fill device should be connected directly to the DSVT is if the common fill cable is damaged and physical loading of a key is essential to the mission.

- c. Connect KYK-13 to the FILL connector of the DSVT using one of the following methods:

NOTE

The preferred method to connect the fill device to the RT-1539 is with the common fill cable.



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Figure 3-6. Digital Subscriber Voice Terminal (DSVT) Fill Connector Location

- (1) Connect KYK-13 connector J1 (1, fig. 3-5) to common fill cable. Connect other end of common fill cable to the DSVT FILL connector (1, fig. 3-6).
- (2) Connect KYK-13 connector P1 (2, fig. 3-5) to DSVT FILL connector (1, fig. 3-6).
- d. Set KYK-13 Z ALL/6,5,4,3,2,1 switch (3, fig. 3-3) at position containing M key to be transferred.
- e. Press and release KYK-13 initiate pushbutton (2) while observing parity indicator (4).
 - (1) If flashes, KYK-13 has good key ready to load. Continue to step f.
 - (2) If does not flash, notify supervisor.
- f. Set Z/ON/OFF CHECK switch (1, fig. 3-3) to ON.

CAUTION

Do not press KYK-13 initiate pushbutton.

- g. Set DSVT FUNCTION SEL switch (4, fig. 3-2) to LDU.
- h. Observe DSVT RING BUSY (9) and NSW (2) indicators.
- i. Press and hold VAR STOR switch (3) at LOAD. Annunciator sounds parity tone.
- j. Release VAR STOR switch to return to normal (center) position. Annunciator sounds parity tone indicating U key has been loaded.
- k. If a 10-second tone or no tone is heard, key has not been properly loaded. Return FUNCTION SEL switch (4) to DSBL and repeat loading steps c through i. If key still does not load properly, notify supervisor.

CAUTION

Do not press KYK-13 initiate pushbutton.

- l. Set KYK-13, Z ALL/6,5,4,3,2,1 switch (3, fig. 3-3) to position containing key to be transferred.
- m. Set DSVT FUNCTION SEL switch (4, fig. 3-2) to LDX.
- n. Observe DSVT RING BUSY (9) and NSW (2) indicators.
 - (1) If on, proceed to step o.
 - (2) If either is off, notify supervisor.
- o. Press and hold VAR STOR switch (3) at LOAD. Annunciator sounds parity tone.
- p. Release VAR STOR switch. Annunciator sounds parity tone indicating R key has been loaded.
- q. If 10-second tone or no tone is heard, key has not been properly loaded. Return FUNCTION SEL switch (4) to DSBL and repeat loading steps l through p. If key still does not load properly, notify supervisor.
- r. Set DSVT FUNCTION SEL switch (4) to OP.
- s. Observe DSVT RING BUSY (9) and NSW (2) indicators, off-hook.

- (1) If RING BUSY indicator is on and NSW indicator is off, proceed to step u.
- (2) If RING BUSY indicator is off and NSW indicator is on, notify supervisor.
- t. Set KYK-13 Z/ON/OFF CHECK switch (1, fig. 3-3) to OFF CHECK.
- u. Disconnect KYK-13 from DSVT using one of the following methods as determined by step c:
 - (1) Disconnect KYK-13 J1 connector (1, fig. 3-5) from common fill cable. Disconnect other end of common fill cable from DSVT FILL connector (3, fig. 3-6).
 - (2) Disconnect KYK-13 P1 connector (2, fig. 3-5) from DSVT FILL connector (3, fig. 3-6).
- v. Connect protective cap to DSVT (3).

3-6.1.5 Personal Code, Directory Number, and Frequency Plan Entry. Perform the following procedure to enter personal code, directory number, and frequency plan.

NOTE

Audible tones indicate DSVT operating conditions. Refer to table 3-2 for the description of tones heard in the handset earpiece.

- a. Remove DSVT handset from cradle. Error tone heard in earpiece.
- b. Using DSVT keypad (6, fig. 3-2), enter 8R2222255555. Error tone stops as key sequence begins and resumes at end of sequence. RT-1539 LOADED DIRECTORY NO. indicator (10, fig. 3-1) is on. Place DSVT handset in cradle.
- c. Remove DSVT handset from cradle (error tone heard in handset) and using DSVT keypad (6, fig. 3-2), enter 8F0000000400R for CONUS diplexer and 8F0000001160R for OCONUS diplexer. RT-1539 LOADED FREQ. PLAN indicator (11, fig. 3-1) flashes and DSVT error tone stops during key sequence.
- d. Observe RT-1539 LOADED FREQ PLAN indicator (11) on and DSVT error tone on. Place DSVT handset on cradle.

3-6.1.6 RT-1539 BIT and VSWR Test. Perform the following procedure to run RT-1539 BIT and VSWR tests.

- a. Press and hold RT-1539 BATT TEST/BIT pushbutton (3, fig. 3-1). All RT-1539 indicators (2, 4, 5, 9, 10, and 11) are on.
- b. Release RT-1539 BATT TEST/BIT pushbutton, DSVT rings.

NOTE

Tones heard in handset are in table 3-2.

- c. Remove DSVT handset from cradle prior to third ring. Error tone heard in earpiece.
- d. Grasp DSVT DEPRESS/LOCK hookswitch (1, fig. 3-2) and pull up. Nonsecure warning tone heard in DSVT handset earpiece. Using DSVT keypad (6) enter R2222255555. Nonsecure warning tone off. Speak into handset and listen for voice in earpiece. Place DSVT handset in cradle.
- e. Remove DSVT handset from cradle. Error tone heard in earpiece. Place DSVT handset in cradle.
- f. Remove DSVT handset from cradle. Using DSVT keypad enter R7654321. RT-1539 ALARM indicator (2, fig. 3-1) off. Place handset in cradle.

- g. At DSVT, set VAR STOR switch to zero and RT-1539 front panel switches as in paragraph 2-7.

3-6.2 Unsatisfactory Test. If any one of the RT-1539 functions fail, the ring tone is sent to the terminal and there is an alarm condition on the RT-1539 (ALARM indicator is on). If none of the functions fail, the test goes to the next phase and tests the terminal lines by looping the transmission and reception channels. A telephone or telephone cord failure can only be detected by listening to the receiver at the end of the test. Such failures are not reported by an indicator. Failure of these items can also be indicated by the absence of ringing at the start of the test.

Table 3-2. Telephone Tones

DEFINITION	DESCRIPTION	FUNCTION
Dial tone	A continuous low tone	DSVT is off hook, and ready to be dialed
Ring back tone	An interrupted (5 seconds) low tone	The dialed number is ringing
Busy tone	An interrupted (5 seconds) low tone (425 Hz)	The dialed number is busy
Error tone	A continuous alternating (5 seconds) tone (425/1050Hz)	A dialing error was made. Hang up and try again
Waiting tone	A continuous mixed tone (350/620 Hz)	Wait until call has been processed
Nonsecure warning	A distinctive tone every 6 seconds	The person calling is not secure

3-6.3 Satisfactory Test. If the test is satisfactory, the ALARM indicator remains off; the AFFILIATED indicator remains off during the affiliation process, but is on when affiliation occurs, and remains on during channel operation (affiliated subscriber); the AFFILIATED indicator flashes if the RAU to which the RT-1539 is affiliated is in the presaturate mode; and SCANNING indicator is on steady or flashing, LOADED FREQ PLAN indicator is on, and LOADED DIRECTORY indicator is on.

3-7 NORMAL SHUTDOWN PROCEDURE.

3-7.1 With COMSEC Key Saved.

- Set OFF/BLACK OUT/ON switch to OFF.
- Ensure all indicators are off.

If affiliated, the RT-1539 automatically disaffiliates. The COMSEC key and frequency plans are saved in memory. The personal code and directory number are not saved to prevent use of RT-1539 by unauthorized personnel.

3-7.2 Without COMSEC Key Saved.

- Press and hold ZERO/FILL switch lever to ZERO.

- c. Set OFF/BLACKOUT/ON switch to OFF
- d. Ensure all indicators are off.
- e. Set FREQ PLAN/NETWORK/RADIONET/STOR switch to STOR.
- f. If RT-1539 is to be shut down for storage or transportation, remove battery (para 5-11.2).

Section III. OPERATION UNDER UNUSUAL CONDITIONS

3-8 OPERATION UNDER EXTREME ENVIRONMENTAL CONDITIONS.

3-8.1 General Procedure. The RT-1539 is weatherproofed for operation in all climates. The following steps should be performed when operating in any climate.

- a. Place protective covers on all receptacles and cable connectors not in use.
- b. Where two cables are connected together, connect protective caps together, if possible.

3-8.2 Arctic Climates.

CAUTION

Extreme cold causes cables to become hard, brittle, and difficult to handle. Avoid kinks and unnecessary cable loops or damage to cable can result.

Do not drag connectors on ground or damage to connectors can result.

- a. Ensure all connections are free of frost, snow, and ice.
- b. Ensure connectors are not placed in snow.

3-8.3 Tropical Climates.

CAUTION

In hot, moist climates, the RT-1539 can be damaged by moisture and fungi.

- a. Wipe moisture and fungi off equipment with lint-free cloth.
- b. Inspect equipment frequently for surface deterioration.

3-8.4 Desert Climates.

CAUTION

In hot, dry climates, connectors and receptacles are subject to damage from windblown sand and dust.

- a. Cover all connectors.
- b. Place protective cover on cable connector if cable is on ground.

3-9 EMERGENCY SHUTDOWN PROCEDURE.

For emergency shutdown:

- a. Set ZERO/FILL switch to ZERO.
- b. Set OFF/BLACKOUT/ON switch to OFF.

CHAPTER 4

OPERATOR MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

4-1 TOOLS AND EQUIPMENT.

No tools or test equipment are authorized for use by the operator.

4-2 REPAIR PARTS.

No repair parts are authorized for operator's maintenance.

Section II. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

No operator PMCS is required for operation of the RT-1539.

CHAPTER 5

UNIT MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

5-1 COMMON TOOLS AND EQUIPMENT.

Authorized tools and common equipment for use by unit maintenance are listed in the Maintenance Allocation Chart (MAC), Tools of Test Equipment Requirement, Appendix B.

5-2 SPECIAL TOOLS AND TEST EQUIPMENT.

Special tools, Test, Measurement and Diagnostic Equipment (TMDE), and support equipment authorized for use by unit maintenance are listed in the MAC in Appendix B.

5-3 REPAIR PARTS.

The only repair parts authorized for replacement at this level are:

- 16A fuse (1)
- 0.25A line fuses (4)
- Fuseholder
- Ground terminal
- Connector caps
- OFF/BLACK OUT/ON switch knob and cap
- Battery
- Battery compartment cap and O-ring
- Decompression screw and O-ring.

Section II. REPAINTING AND REFINISHING INSTRUCTIONS

CAUTION

Before painting, all unpainted surfaces, nameplates, decals, Modification Work Order (MWO) information, and other markings must be masked.

5-4 PAINTS AND FINISHES.

Paints or finishes authorized for use on MSRT components are listed in TB 43-0118, Field Instructions for Painting and Preserving Electronics Command Equipment.

5-5 PAINTING INSTRUCTIONS.

Refer to TB 43-0118, Field Instructions for Painting and Preserving Electronics Command Equipment, for instructions about painting the RT-1539.

5-6 REFINISHING INSTRUCTIONS.

- a. Remove rust and corrosion from metal surfaces by lightly sanding with fine sandpaper.
- b. Brush two thin coats of paint on bare metal.

- c. Refer to TB 43-0118 for cleaning and refinishing practices.

5-7 CAMOUFLAGE PAINTING.

Communications-electronic equipment systems requiring camouflage pattern painting and operating under controlled environmental conditions (air-conditioned) shall be painted in accordance with the patterns prescribed in TB 43-0118.

5-8 ITEMS NOT TO BE PAINTED.

The following parts of the RT-1539 are not to be painted:

- Connectors
- Indicators
- Metal surfaces beneath ground lugs
- Gaskets.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

5-9 GENERAL.

NOTE

When performing PMCS or routine check, observe all WARNINGS and CAUTIONS listed at the beginning of this manual, at the appropriate place in the procedures, or on plates and decals attached on the equipment.

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain equipment in serviceable condition. To be sure that the equipment is always ready for a mission, do the scheduled preventive maintenance checks and services.

5-10 PMCS PROCEDURES.

5-10.1 Routine Checks. Routine checks like cleaning, dusting, washing, checking for loose and chipped paint, checking for damaged or frayed cables, storing items not in use, covering unused receptacles, checking for completeness and checking for loose nuts, bolts, and screws are not listed in PMCS. They are things that should be done anytime they are needed. Use the following list as a guide when doing checks on the equipment:

- External condition of RT-1539
- Power and signal entrances and cable connections
- Ground connections
- Power, signal, and ground cables
- Panel markings
- Complete set of maintenance manuals for RT-1539.

5-10.2 Continuous Operation. If the RT-1539 must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

5-10.3 Defects. Deficiencies that cannot be corrected must be reported to higher level maintenance personnel. Records and reports of preventive maintenance must be made in accordance with procedures given in DA Pam 738-750.

5-10.4 Scheduling. PMCS must be done at the specified times, if possible. If operational requirements prevent doing PMCS at the specified time, make the required checks and services at the first opportunity. During operation, PMCS must be done regularly to help spot problems before they become big problems.

5-10.5 PMCS Table. Table 5-1 contains the PMCS procedures. It indicates what items to check, when to check them, and how to check them. Perform the PMCS procedures thoroughly and always observe WARNINGS and CAUTIONS.

a. ITEM NO. Column. The checks and services are listed in the order that you should do them. Use this number for the TM number on DA Form 2404, Equipment Inspection and Maintenance Worksheet, to record results of checks and services.

b. INTERVAL Columns. The column headed M contains a dot opposite the appropriate checks. This indicates when to perform the PMCS procedure.

c. ITEM TO BE INSPECTED Column. The items listed in this column indicate what part of the equipment is to be checked.

d. PROCEDURE Column. This column indicates how to perform the checks on the items listed in the ITEM TO BE INSPECTED column.

Table 5-1. Unit Preventive Maintenance Checks and Services

M = Monthly

ITEM NO.	INTERVAL		ITEM TO BE INSPECTED	PROCEDURES
	M	S		
1	•		RT-1539	Perform BIT (para 3-6)
2	•		Battery Test	<p>NOTE</p> <p>The test requires the RT-1539 to be turned off for more than 20 seconds before test is started.</p> <p>a. Set OFF/BLACKOUT/ON switch to OFF</p> <p>b. Wait 20 seconds minimum</p> <p>c. Push BATT TEST/BIT pushbutton</p> <p>d. Observe BATT OK indicator status. If BATT OK indicator is on, the battery is OK. If BATT OK indicator is off, replace battery</p>

Table 5-1. Unit Preventive Maintenance Checks and Services – Continued

M = Monthly

ITEM NO.	INTERVAL		ITEM TO BE INSPECTED	PROCEDURES
	M	S		
3		•	Battery	Remove and replace in accordance with procedures in Chapter 5

Section IV. TROUBLESHOOTING PROCEDURES

5-11 TROUBLESHOOTING THE RT-1539.

A functional test of the RT-1539 can be performed by using the Built-In Test (BIT) capability of the equipment. Unit level testing of the RT-1539 is limited to the BIT procedure, battery test procedure, and fuse testing.

WARNING

Turn off RT-1539 power before performing the following procedure.

5-11.1 Fuses Test Procedure. Perform the following procedure to test the fuses.

- a. Remove four .25 amp and one 16 amp fuse from RT-1539 using procedures in paragraphs 15-12.1 and 15-12.2.
- b. Check fuses using multimeter.
- c. Replace fuses in accordance with procedures in paragraphs 15-12.1 and 15-12.2.

5-11.2 Battery Test Procedure. Perform the following procedure to test battery.

NOTE

This test requires the RT-1539 to be turned off for more than 20 seconds before test is started.

- a. Set OFF/BLACKOUT/ON switch at OFF.
- b. Wait 20 seconds minimum.
- c. Press BATT TEST/BIT pushbutton.
- d. Observe BATT OK indicator status. If BATT OK indicator is on, the battery is OK. If BATT OK indicator is off, replace battery.

5-11.3 Built-in Test. Perform the following steps in the order listed.

NOTE

Power up RT-1539 radio before performing BIT procedure.

- a. Press and hold BATT TEST/BIT pushbutton. Ensure all front panel indicators are on.
- b. Release BATT TEST/BIT pushbutton. Check that BIT sequence starts, and ring tone is transmitted to handset.
- c. Remove handset from hook.
- d. Dial personal code and directory number: R+PC+LNXXX.

If the correct number has been dialed, a test is automatically run on the main functions and a wait tone will be heard in the handset receiver.

Section V. MAINTENANCE OF RT-1539

5-12 REMOVAL AND REPLACEMENT PROCEDURES.

Use the following procedures to replace the items indicated. Refer to figure 5-1 for location of components to be removed.

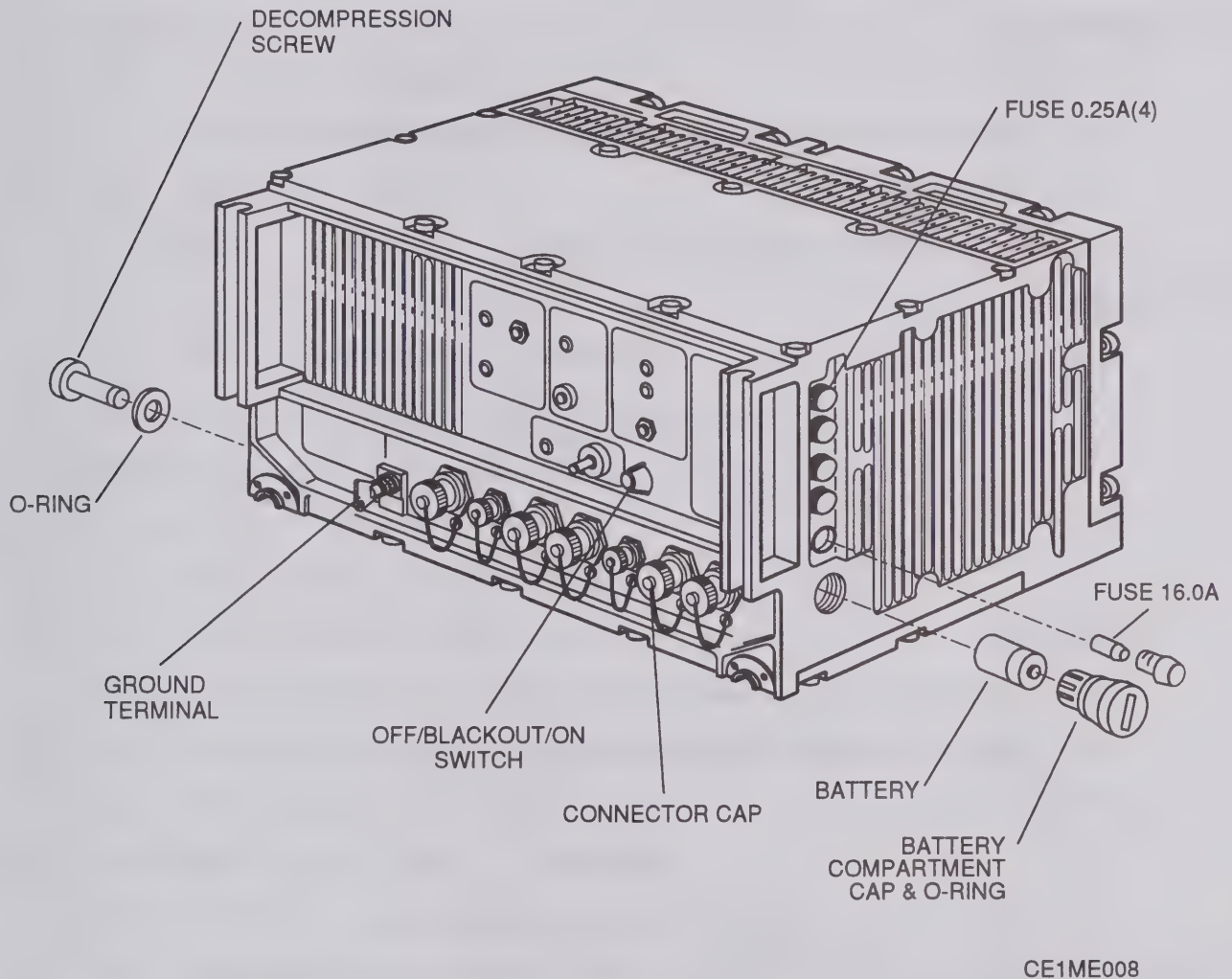


Figure 5-1. RT-1539A(P)(C)/G Unit Level Replacement Items

WARNING

Turn off RT-1539 before replacing any item.

5-12.1 Fuses. Fuse replacement procedure is identical for the 16.0A and 0.25A fuses.

a. Removal.

- (1) Unscrew fuseholder and withdraw it from right side of RT-1539 cabinet.

- (2) Remove blown fuse from fuseholder.

b. Replacement.

- (1) Insert new fuse with correct amperage into fuseholder.
- (2) Screw in fuseholder.

5-12.2 Fuseholders.

a. Removal.

- (1) Unscrew fuseholder and withdraw it from right side of RT-1539.
- (2) Replace fuseholder.

b. Replacement. Reverse order of removal (1) above.

5-12.3 Batteries.

CAUTION

DO NOT dispose of batteries with ordinary trash/refuse. Turn in batteries to your local-serving Defense Reutilization and Marketing Office (DRMO).

ONLY use batteries that have been authorized for this equipment.

a. Removal.

- (1) Using 3/8-inch flat tip screwdriver remove battery compartment cap.
- (2) Remove failed battery from battery compartment cap.

b. Replacement.

CAUTION

Ensure plus (+) and minus (–) terminals are correctly placed.

- (1) Install new battery in compartment.
- (2) Using 3/8-inch flat tip screwdriver, replace battery compartment cap.

5-12.4 Battery Compartment Cap and O-ring.

a. Removal.

- (1) Using 3/8-inch flat tip screwdriver, remove battery compartment cap and O-ring.
- (2) Replace battery compartment cap and O-ring.

b. Replacement.

- (1) Insert battery compartment cap and O-ring into battery compartment.
- (2) Using 3/8-inch flat tip screwdriver, tighten battery compartment cap until snug.

5-12.5 OFF/BLACKOUT/ON Switch Knob and Caps.

a. Removal.

- (1) Remove cap from defective knob.
- (2) Use 5mm socket wrench to remove nut.
- (3) Remove knob from shaft.

b. Replacement.

- (1) Insert replacement knob on shaft.
- (2) Use 5mm socket wrench to tighten nut.
- (3) Replace cap on replacement knob, align cap line with knob line.

5-12.6 Connector Cap.

a. Removal.

- (1) Remove defective cap from connector.
- (2) Use needlenose pliers to remove nylon string from cap.

b. Replacement.

- (1) Use needlenose pliers to replace nylon string on replacement cap.
- (2) Install replacement cap on connector.

5-12.7 Decompression Screw and O-ring.

a. Removal.

- (1) Using 3/8-inch flat tip screwdriver, remove decompression screw from left side of RT-1539.
- (2) Replace decompression screw and O-ring.

b. Replacement.

- (1) Insert decompression screw and O-ring into left side of RT-1539.
- (2) Using 3/8-inch flat tip screwdriver, turn decompression screw counterclockwise until flush with outside case of RT-1539.

5-12.8 Ground Strap Terminal.

a. Removal.

- (1) Turn thumbscrew counterclockwise until removed.
 - (2) Remove ground strap terminal.
- b. Replacement.
- (1) Place ground strap terminal on stud.
 - (2) Place thumbscrew on stud and turn clockwise until tight.

5-13 REPAIR PROCEDURES.

Repair of the following is performed by removal and replacement:

- Fuse
- Fuseholder
- Battery
- Battery compartment cap and O-ring
- OFF/BLACK OUT/ON switch knob and cap
- Connector caps
- Decompression screw and O-ring
- Ground terminal.

CHAPTER 6

FUNCTIONING OF EQUIPMENT

6-1 GENERAL.

The RT-1539A(P)(C)/G is an FM radio transceiver with a built-in module for automatic encryption and decryption of all communications. The RT-1539 contains seven main subassemblies: radio control unit, logic unit, transmitter-duplexer unit, power supply, frequency synthesizer unit, receiver unit, and mobile COMSEC unit (MCU).

The RT-1539 functions (fig. 6-1) are controlled under centralized management by a microprocessor. A Built-in Test (BIT) is included in the form of a particular program that runs a check on the responses of the operational circuits in their various configurations.

Three major functions of the RT-1539 are performed by the radio subassembly, which provides analog signal processing and whose main functions include modulation-demodulation and transmission-reception; the radio control unit (RCU), a hybrid assembly which provides the interfacing between the analog and digital assemblies, and the logic unit, which processes the received and transmitted signals.

A front panel switch (function selector) has three positions labeled RAU, MSRT, and MSRT REMOTE CONTROL. This allows the one radio to serve both roles. In either application the radio operates in a full-duplex mode with a high and low frequency band containing transmit and receive channels. The identification of these bands is interchanged in the RAU and MSRT application. In the RAU application, the radio transmits in the high frequency band and receives in the low band. In the MSRT application, the role of the bands are reversed. (In the MSE System, the REMOTE CONTROL position of the function selector switch is not used.) But a MSRT in a direct radio call works like in a RAU mode application.

Output is through a coaxial cable connector that interfaces to an antenna. Input is from a telephony type device interfaced by a multipin connector.

Primary modes of operation are RAU/MSRT. The RT-1539 allows setting up full-duplex encrypted radio transmission between mobile subscribers and a fixed or mobile subscriber on the network via Radio Access Unit (RAU) stations. The radio can be used for two modes: All subassemblies are shown in figure 6-2.

- As a Mobile Subscriber Radio Terminal (MSRT)
- As a radio connection equipment of the RAU.

In both modes it ensures:

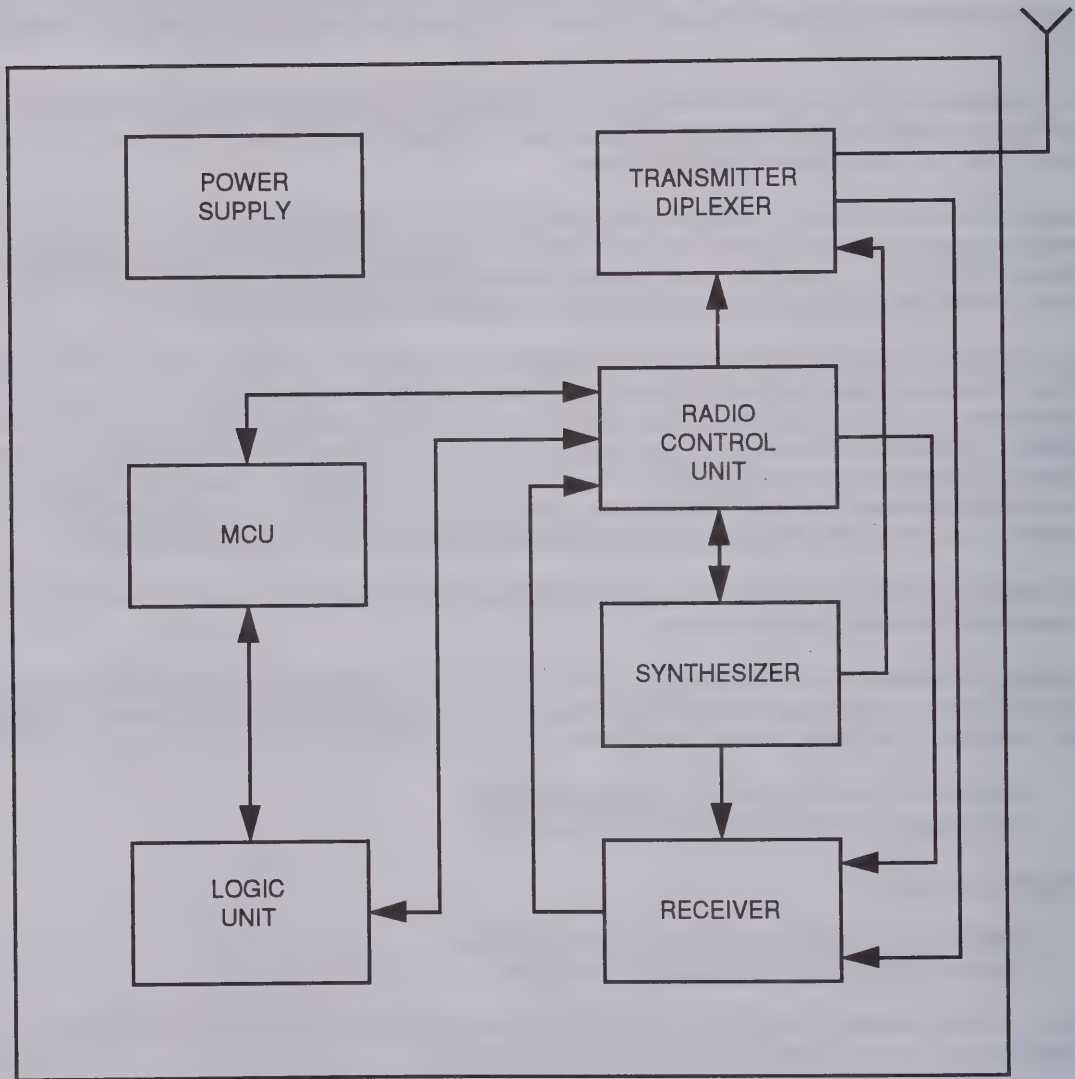
- Digitizing and encryption of the transmitted data
- The inverse operations of the received data.

In the MSRT mode, the radio interfaces to the Digital Secure Voice Terminal (DSVT) at a rate of 16 kb/s and is connected to the tactical vehicles omnidirectional antenna.

In the RAU mode, the radio interfaces to the Node Center Switch (NCS) at a rate of 16 kb/s via a digital transmission group.

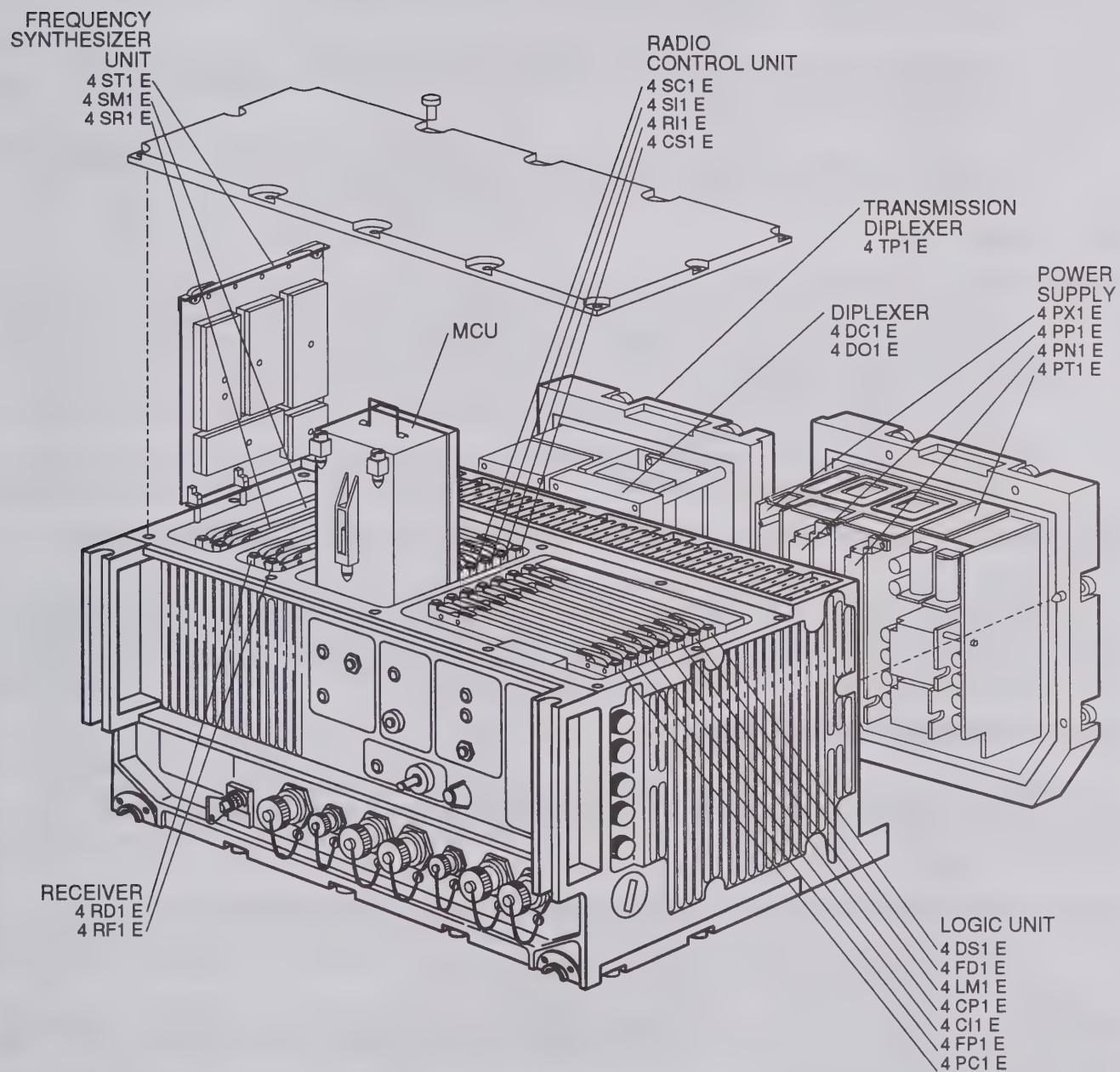
6-2 RADIO CONTROL UNIT.

Under control of the logic unit, the radio control unit (RCU) allows the selection of the emission and reception channel and ensures the interface between the central processor unit and the radio unit. The RCU is a peripheral of the control processor - master-slave logic - and is controlled by a single microprocessor 8031 located on the



CE1ME010

Figure 6-1. Main Function Block Diagram



CE1ME014

Figure 6-2. RT-1539A(P)(C)/G Main Modules

channel selection circuit card assembly. The RCU consists of six modules carried on four circuit card assemblies (CCAs):

- Channel selection CCA 4CS1E carries the microprocessor that converses with the central unit
- Tx/Rx data shaping CCA 4SC1E carries the 19.2 kb/s transmit and receive circuitry, a clock generating device, and a test interface
- Synthesizer interface CCA 4SI1E carries the various circuits ensuring, under control of the microprocessor, interface between the channel selector, transmitter synthesizer, receiver synthesizer, and the transmitter
- Receiver interface CCA 4RI1E carries, under control of the microprocessor, circuits interfacing with the receiver, power supply test circuits, and alarm signals of the radio set.

6-3 LOGIC UNIT.

Based on microprocessor dialog techniques, this unit implements the following internal circuits:

- 4PC1E Secondary HAEMP protection for some front panel connectors
- 4DS1E Packetizing/depacketizing the encoded/decoded technical and signalling messages
- 4FD1E Frequency decryption
- 4CI1E MCU and GLU interface
- 4FP1E Front panel management
- 4LM1E Loop signaling modulator/demodulator
- 4CP1E Control Processing Unit (CPU).

The modules are connected by means of a master-slave logic principle. The CPU provides the master function.

The packetizer and depacketizer CCAs are used to organize the data flow according to a predetermined protocol. The radio signaling encryptor selection is used in a signaling mode to control the flow of technical data. The frequency decryptor receives the frequency plans. The loop signaling modulator/demodulator controls the link with the NSC or the DSVT depending upon application.

6-4 TRANSMITTER-DIPLEXER.

Transmitter-Diplexer is divided into two separate functional blocks, the transmitter block and the diplexer block. One of two diplexer modules is installed in the RT-1539. These modules are for inside the continental U.S. (CONUS) and outside the continental U.S. (OCONUS).

Power is controlled by an electronically controlled variable attenuator. Power control provides:

- Operation at optimal power
- Protection against any mismatching of the output circuits.

Adjustment to the power transmitted, with respect to the radiowave path to cover the transmission distance, is measured at reception on one frequency and transmitted to the transmitter on the other frequency in the channel pair (duplex transmission).

The diplexer separates the transmission and reception frequencies (upper from lower). During transmission it samples the direct and reflected power for controlling transmission output power. While BIT is running, a portion of transmission power is reinjected to verify correct operation of the output.

6-5 POWER SUPPLY.

The RT-1539 is powered from an external power supply whose voltages can vary from 21 to 33 V. All internal voltages required for powering the various circuits are delivered by the power supply subassembly.

The power supply subassembly consists of four modules:

- Power supply/transmitter/heat sink, 4PT1E CCA, generates transmit power
- Power supply/negative 4PN1E CCA, generates negative power
- Power supply/positive 4PP1E CCA, generates positive power
- Logic monitoring and 5 V auxiliary module command 4PX1E CCA, controls the various logic functions.

The CCA 4PT1E also contains the input and output voltage connectors.

6-6 SYNTHESIZER.

The synthesizer subassembly consists of three parts:

- 4SR1E CCA - Receive frequency synthesizer
- 4SM1E CCA - Modulation frequency synthesizer
- 4ST1E CCA - Transmit frequency synthesizer.

The synthesizer simultaneously generates all frequencies required for controlling the transmitter, receiver, and logic unit. All circuits use indirect frequency synthesis techniques to produce their signals. The indirect frequency synthesis has been organized to produce a stable frequency.

Through a buffer amplifier, the Voltage Controlled Oscillator (VCO) signal is applied to a 3-dB splitter resulting in two signals that are intended for use by the output stage and the internal synthesis circuits.

A phase detector receives the VCO signal and the reference signal. The error signal, at the phase detector output, is applied to the VCO through a loop filter.

6-7 RECEIVER.

This subassembly is used for selection, filtering, demodulation, and leveling of the received signals from the antenna by the diplexer (when used in an MSRT) or directly (when used in a RAU). The receiver assembly consists of two modules. The first contains servo controlled band selectors and demodulators (frequency mixer and filter). The second contains a phase servo loop circuit and the servo loop controlling the band selector and attenuators.

The receiver has a sensitivity controller. The controller uses the variable attenuator on the receiver input to set overall sensitivity with respect to the receiver field.

All data involving the transmission margin are available to the receiver locally. Afterward, sensitivity adjustment is continuous throughout the call. The regulation threshold is set to provide a safety margin of several decibels on the link.

The signals are received from the diplexer by the continuously controlled attenuators. They are then routed to a band preselector used to eliminate useless information. The useful signal is extracted from the carrier through a filter, amplifier, and mixer, and then sent by a phase-comparator demodulator to the output.

Two coherent energy sensors continuously check to determine whether the received signal is a useful signal or noise. The receiver circuits are located on CCAs 4RD1E and 4RF1E.

6-8 MOBILE COMSEC UNIT.

Digital signals are encrypted-decrypted in Mobile COMSEC Unit (MCU) located in the RT-1539.

The data transmitted over each VHF duplex channel is bit-to-bit encrypted at the transmitting end and decrypted at the receiving end when the radio call is set up, this mode is called on-line operation.

At the beginning of the call setup procedure, the signaling messages that are exchanged between the mobile subscriber and its parent RAU (or between the two mobile subscribers in the case of a direct call) are encrypted on a block-basis prior to their transmission over-the-air. This mode is called off-line operation.

In order to ensure adequate red/black separation within the radio equipment, all transmitted data is forwarded to the MCU, which in turn sends it to the RF section of the radio, and all received data is forwarded by the RF section to the MCU, which then sends it to the processing section of the radio.

CHAPTER 7

INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL INFORMATION

7-1 GENERAL.

This chapter provides troubleshooting and maintenance instructions for intermediate direct support maintenance personnel. Items identified as faulty beyond the maintenance capability of unit maintenance are referred to intermediate direct support maintenance. Corrective maintenance is performed at the equipment site whenever possible.

7-2 VERIFICATION OF REPAIR.

Before troubleshooting any equipment reported to be faulty, verify the fault by repeating the diagnostic program or the operational status check that first revealed the fault to the operator or unit maintenance personnel. After a fault has been isolated and corrected, perform the operational check again to verify that the fault has been corrected.

Section II. TOOLS AND EQUIPMENT

7-3 TOOLS AND TEST EQUIPMENT.

The test group, with associated computer and test measuring instruments, is designed to facilitate the RT-1539 maintenance at the Intermediate Direct Support (IDS) level. The test group aids in identifying a faulty subassembly or a group of CCAs followed by more precise localization of failure (accomplished by exchanging cards) and, after replacement of faulty CCAs or subassemblies, ensures that the RT-1539 is in proper working condition.

7-4 REPAIR PARTS.

Repair parts authorized for use by intermediate direct support maintenance personnel are listed in the Repair Parts and Special Tools List (RPSTL) in Appendix F of this manual. Listed repair parts authorized for use at the unit level are also authorized for use at the IDS level.

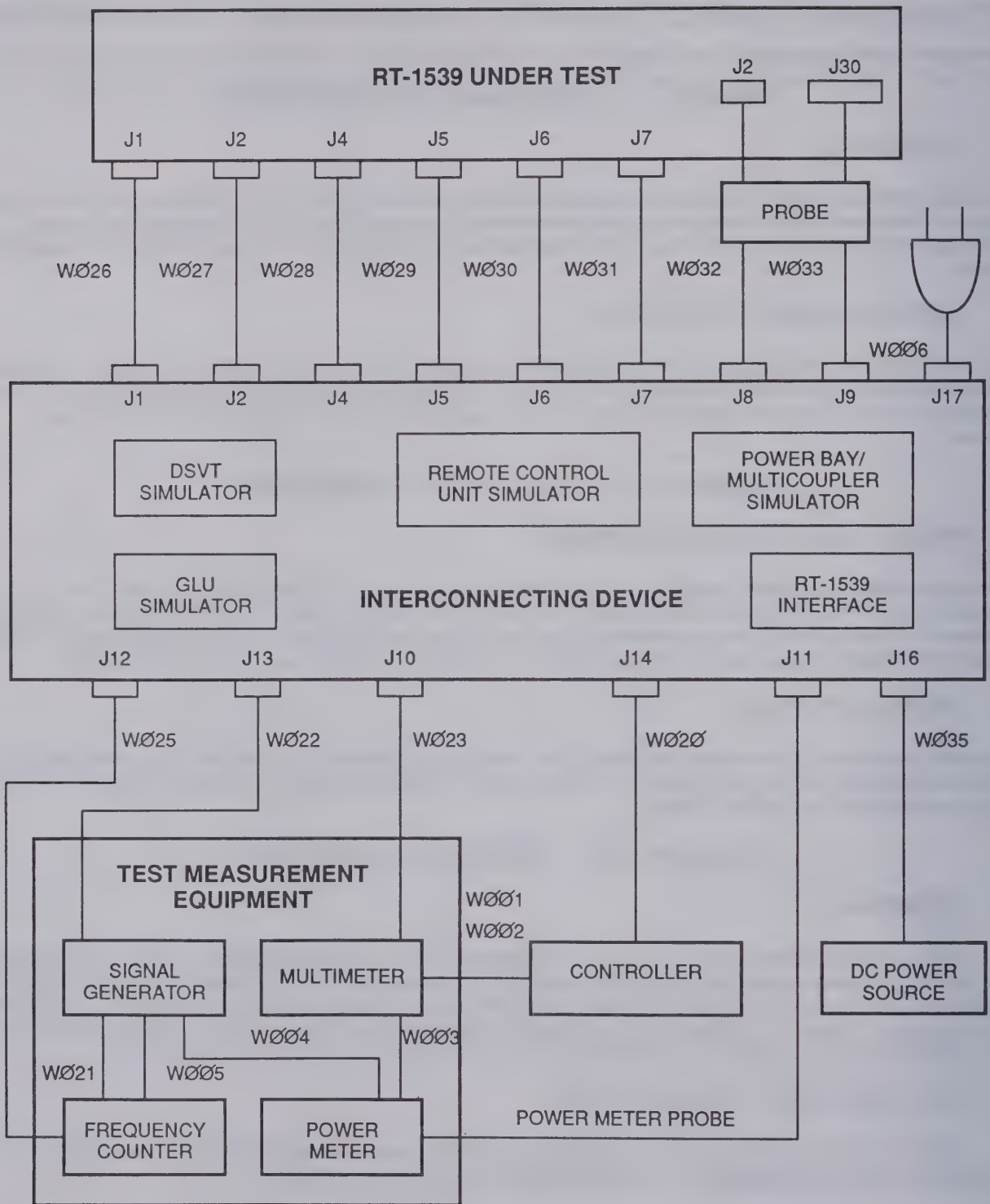
Section III. TROUBLESHOOTING

7-5 GENERAL.

7-5.1 This section contains the fault isolation and detailed troubleshooting procedures required to identify and correct an RT-1539 malfunction that cannot be isolated by BIT procedures. Fault isolation at this level consists primarily of a sequence of tests using the test group to verify malfunctions, isolate faulty assemblies, and confirm normal operation. Figure 7-1 illustrates the test group interconnection with the RT-1539. Refer to table 7-1 for cable connections of the test group and the cable connections from the test group to the RT-1539.

7-6 PRELIMINARY OPERATIONS.

7-6.1 Preliminary Setup. Refer to TM 11-6625-3189-12&P for setup and self-test of the test group. Perform the following procedure to prepare the RT-1539 Unit Under Test (UUT) for testing.



CE1ME019

Figure 7-1. Test Group Interconnection Diagram

Table 7-1. Test Group Cable Connections

CABLE	FROM	TO
W001, W002	Controller IEEE-488 data port (slot 6)	Multimeter data port
W003	Multimeter data port	Power meter data port
W004	Power meter data port	Signal generator data port
W005	Signal generator data port	Frequency counter data port
W006	ICD J17	115 Vac power source
W020	Controller serial data port (slot 5)	ICD J14
W021	Signal generator EXT REF INPUT 1, 2, 5, 10 MHz	Frequency counter 10 MHz STD OUTPUT
W022	Signal generator RF output	ICD J13
W023	Multimeter input	ICD J10
W025	Frequency counter INPUT A	ICD J12
W026	ICD J1	RT-1539 under test J1
W027	ICD J2	RT-1539 under test J2
W028	ICD J4	RT-1539 under test J4
W029	ICD J5	RT-1539 under test J5
W030	ICD J6	RT-1539 under test J6
W031	ICD J7	RT-1539 under test J7
W032	ICD J8	Probe J8
W033	ICD J9	Probe J9
W035	24 Vdc power source	ICD J16
W036	RT-1539 J5	DNVT
Power meter probe	Power meter sensor	ICD J11

WARNING

To avoid serious injury to personnel, ensure that external power to the test group is off.

NOTE

To connect the probe that is connected to cables W032 and W033, it is required that the cover be removed and the test cover is installed.

- a. Remove UUT top cover.
- b. Place test cover on forward left side of UUT.
- c. Hand tighten four screws on test cover.

7-6.2 RT-1539 Preparation. Connect the remaining cables from the test group to the UUT as listed in table 7-1. Perform the following procedure to prepare the UUT for testing.

- a. Set UUT OFF/BLACK OUT/ON switch to OFF.

NOTE

Ensure that the external dc power source to the test group is set to ON and that UUT NETWORK /RADIONET/STOR switch is set to NETWORK.

If radio should power up in an alarm state (ALARM/BATT OK indicator remains on), cycle OFF/BLACKOUT/ON switch OFF, then ON, rapidly. If alarm cannot be cleared in this manner, refer to specific troubleshooting information.

- b. Set UUT OFF/BLACK OUT/ON switch to ON.
- c. Using KYK-13, load maintenance key into RT-1539. Refer to paragraph 3-6.1.3 for key loading procedure.
- d. Set UUT OFF/BLACK OUT/ON switch to OFF.
- e. Set UUT RAU/MSRT/REMOTE CONTROL switch to REMOTE CONTROL.
- f. The first test screen provides for selection of testing UUT or exiting from test program (para 7-2).

7-6.3 Performing BIT Using the Test Group. The following procedure must be used in place of the standard BIT as described in paragraph 3-6. Successful completion of the BIT does not necessarily indicate proper operation of the RT-1539. To ensure proper operation of the RT-1539, continue testing using the test group.

WARNING

To avoid serious injury to personnel, ensure that external power to the test group is off.

- a. Disconnect all previously connected cables from the UTT to the test group (fig 7-1).

- b. Connect cable W036 from DNVT to RT-1539 J5 and cable W026 from Interconnecting Device (ICD) J1 to RT-1539 J1.
- c. Set external dc power source on.

- d. On RT-1539 (fig. 3-1):
 - (1) Set OFF/BLACKOUT/ON switch (7) to OFF.
 - (2) Set NETWORK/RADIONET/STOR switch (1) to NETWORK.
 - (3) Set RAU/MSRT/REMOTE CONTROL switch (6) to MSRT.
 - (4) Set OFF/BLACKOUT/ON switch (7) to ON.
- e. On KYK-13 (fig. 3-3):
 - (1) Set Z/ON/OFF CHECK switch (1) to OFF CHECK.
 - (2) Set 1/2/3/4/5/6/Z ALL switch (3) to 1.
- f. Connect KYK-13 to RT-1539 J3 FILL connector using common fill cable.
- g. Set KYK-13 Z/ON/OFF CHECK switch (1) to OFF CHECK.
- h. Set KYK-13 1/2/3/4/5/6/Z ALL switch (3) to desired position.

NOTE

Use maintenance key only during RT-1539 troubleshooting. Do not use an operational key. Zeroize the RT-1539 when troubleshooting is completed. Never store or transport the RT-1539 with the maintenance key still loaded.

- i. Press KYK-13 load pushbutton (2). KYK-13 parity indicator flashes indicating transfer of key.
- j. Set KYK-13 Z/ON/OFF CHECK switch (1) to ON.
- k. Momentarily set RT-1539 ZERO/FILL switch (8, fig. 3-1) to FILL four times. RT-1539 CRYPTO ALARM indicator (9) is off.
- l. Remove DNVТ handset from cradle. Error tone heard in earpiece.
- m. Using DNVТ keypad, enter 8R222225555. Error tone stops as key sequence begins and resumes at end of sequence. RT-1539 LOADED DIRECTORY NO. indicator (10) is on. Place DNVТ handset in cradle.
- n. Remove DNVТ handset from cradle (error tone heard in handset) and, using DNVТ keypad, enter 8F0000000400R for CONUS diplexer and 8F0000001160R for OCONUS diplexer. RT-1539 LOADED FREQ. PLAN indicator (11) flashes and DNVТ error tone stops during key sequence.
- o. Observe RT-1539 LOADED FREQ PLAN indicator (11) is on and DNVТ error tone on. Place DNVТ handset on cradle.
- p. Press and hold RT-1539 BATT TEST/BIT pushbutton (3). All RT-1539 indicators (2, 4, 5, 9, 10, and 11) are on.
- q. Release RT-1539 BATT TEST /BIT pushbutton. DNVТ rings.

NOTE

Tones heard in handset are listed in table 3-2.

- r. Remove DNVТ handset from cradle prior to third ring. Error tone heard in earpiece.

- s. Using DNVVT keypad, enter R2222255555. Speak into handset and listen for voice in earpiece. Place DNVVT handset in cradle.
- t. Remove DNVVT handset from cradle. Error tone heard in earpiece. Place DNVVT handset in cradle.
- u. Remove DNVVT handset from cradle. Using DNVVT keypad, enter R7654321. RT-1539 ALARM indicator (2, 3-1) not on. Place handset in cradle.
- v. On RT-1539, set OFF/BLACKOUT/ON switch (7) to OFF.
- w. Set external dc power supply to off.
- x. Remove DNVVT cable from RT-1539 J5 connector J5 and cable W028 from ICD J1 and RT-1539 J1 connectors.

7-6.4 RT-1539 Test Software Utilized. If the software being used to test the RT-1539 is the manual version, go to paragraph 7-6.4.1; otherwise, go to paragraph 7-6.4.2.

7-6.4.1 Manual RT-1539 Test. Following procedure should be performed only after RT-1539 preparation (para 7-6.2) and/or BIT test (para 7-6.3) were completed. Perform steps in the sequence listed.

- a. Perform RT-1539 test configuration self-test. Refer to TM 11-6625-3189-12&P.
- b. Connect UUT to test group as listed in table 7-1.

NOTE

In order to run test E or any of the subtests (scenarios) of test E, RT-1539 CONUS (disk 2) or OCONUS (disk 3) test disk must be inserted before pressing ENTER following the entry of the letter E.

If FILE NOT FOUND is displayed by the controller display after selecting a test, select DISCONNECT. Type 1 from test start-up screen and ensure that a 0 (zero) is entered for the version number and the proper diplexer mode is selected.

- c. Run sequence of tests in alphabetical order (para 7-7.1, Manual Test Procedures) until an error (NOK) is encountered. Test names are B, C, D, and E.
- d. Refer to figure 7-2 for illustration of results table that is displayed after running one of group tests for groups B, C, or D. Refer to figure 7-3 for illustration of results table for group E.

NOTE

If wrong key is pressed when attempting to exit from the results display and normal exit is not possible (by pressing the keys Q and A), press the ESC key on the controller keyboard.

- e. To exit from displayed results table, type letters Q and A on controller keyboard.

TEST GROUP : B0.EXE.

=====

TEST NAME	RET
B010	OK
B020	OK
B030	OK
B050	OK

CE1ME020

Figure 7-2. Sample Group B, C, or D Test Results Display

TEST NAME	TEST COMPLETED	EXECUTION REPORT
E01	OK	OK
E02	OK	OK
E03	OK	OK
E04	OK	OK
E05	OK	OK
E06	OK	OK
E07	OK	OK
E08	OK	OK
E09	OK	OK
E10	OK	OK
E11	OK	OK
E12	OK	OK
E13	OK	OK
E14	OK	OK
E15	OK	OK

CE1ME021

Figure 7-3. Group E Test Results Display

NOTE

If a failure is detected in either the D or E groups, it is necessary to momentarily set 24 Vdc power source to OFF before performing any further testing.

- f. If any tests fail, NOK is displayed in the RET column for groups B, C, or D, and a NOK in either TEST COMPLETED column for group E, select test that corresponds to test that failed (NOK) after returning to the test selection screen. Refer to figure 7-4 for illustration of test results table.

NOTE

To scroll up and down (see information above or below the top or bottom of the screen), use the up and down cursor keys.

- g. Refer to paragraph 7-9.2 for description of displayed test results and paragraph 7-7.4 for a description of how to interpret the results. To exit from table, type letters Q and A on controller keyboard.
- h. After exiting from results table, test selection screen appears. If another test or scenario is selected, screen display continues as described in paragraph 7-7.1, Manual Test Procedures. If DISCONNECT is desired (disconnection of RT-1539 under test from test group), refer to paragraph 7-7.2.

7-6.4.2 **Automatic RT-1539 Test.** Following procedure should be performed only after RT-1539 preparation (para 7-6.2) and/or BIT test (para 7-6.3) were completed. Perform steps in the sequence listed.

- a. Perform RT-1539 test configuration self-test. Refer to TM 11-6625-3189-12&P.
- b. Connect UUT to test group as listed in table 7-1.
- c. Wait for the program to detect a fault, then perform the actions described on the display of the controller. Refer to paragraph 7-7.4.1, Automatic Test Procedures, for the sequence of screens for testing and some sample fault screens.
- d. After completion of the automated test, perform functional tests (refer to para 7-7.4.1.2).
- e. Upon successful completion of the functional tests, select final procedures (refer to para 7-7.4.1.3).

7-7 MANUAL TEST OPERATIONS.

Perform the procedures in the following paragraphs only if the manual version of the RT-1539 test software is being used.

7-7.1 **Manual Test Procedures.** Use the following procedure to perform a test or series of tests on the RT-1539 using the test group.

- a. After typing 1 and pressing ENTER from test start-up screen (fig. 7-5), diplexer mode selection screen (fig. 7-6) appears on controller display. Type 0 (zero) and press ENTER for RT-1539 version number. Selection of diplexer mode is determined by whether 4DC1E (CONUS) or 4DO1E (OCONUS) CCA is present in RT-1539 under test. Type appropriate key for diplexer type and press ENTER. After pressing ENTER, RT-1539 preparation screen (fig. 7-7) appears on controller display.
- b. RT-1539 preparation screen is provided for informational purposes only. Ensuring actions on screen have been performed enables proper testing of RT-1539. Press any key to continue. After pressing key, RT-1539 to ICD connections screen (fig. 7-8) appears on display.

NOTE

Ensure probe is properly installed (fig. 7-9) in RT-1539 under test.

- c. Ensure that all actions on RT-1539 to ICD connections screen have been performed including insertion of probe and installation of test cover. After ensuring all actions have been accomplished, press any key to continue. After pressing key, the test selection screen (fig. 7-10) appears on controller display.
- d. Test selection screen provides selection for either performing test or disconnecting RT-1539 under test from test group. To perform test, refer to paragraph 7-5.2. While test is being performed, test-in-progress screen (fig. 7-11) appears on controller display. To disconnect RT-1539 under test from test group, refer to paragraph 7-7.2.

TEST GROUP : B020.EXE.

=====

TEST	RET.	CCA		ALARMS							MEASURES		
		ex	un	ci	cs	ds	fd	fp	lm	ps	V	W	Hz

CE1ME022

Figure 7-4. Test Results Table Display

RT 1539 REPAIR SESSION

1 : RUN.

2 : EXIT.

CHOICE: _

CE1ME122

Figure 7-5. Start-up Screen

RT 1539 VERSION

R/T 1539 VERSION NUMBER: _

DIPLEXER MODE , C(onus) / O(conus): _

CE1ME023

Figure 7-6. Diplexer Mode Selection Screen

RT-1539 PREPARATION

CHECK CABLE C6 TO J6 VHF RADIO.
CHECK CABLE C4 TO J4 VHF RADIO.
CHECK FUSES.
CHECK RT1539 IN STORAGE MODE MORE THAN 30 SEC.
SET THE SWITCH POWER-SUPPLY TO ON POSITION.
SET RT 1539 NET/RAD/STOR SWITCH TO NETWORK.
SET RT 1539 RAU/MSRT/REMOTE SWITCH TO MSRT.
SWITCH RT 1539 "ON".
LOAD THE CRYPTO KEY AS IN THE TM 30 MANUAL. (RT 1539)
SWITCH RT 1539 "OFF".
CHECK SWITCH RT 1539 IN "REMOTE CONTROL".

PRESS ANY KEY WHEN DONE

CE1ME024

Figure 7-7. RT-1539 Preparation Screen

RT 1539 CONNECTIONS TO VHF_TB

CHECK CABLE C1 FROM VHF_TB J1 TO RT 1539 J1.
CHECK CABLE C2 FROM VHF_TB J2 TO RT 1539 J2.
CHECK CABLE C5 FROM VHF_TB J5 TO RT 1539 J5.
CHECK CABLE C7 FROM VHF_TB J7 TO RT 1539 J7.
CHECK PROBE FROM VHF_TB J8 AND J9 TO RT 1539 J30.
CHECK CABLE P2 FROM PROBE TO P2 4SC1E.
CHECK TEST-COVER IN PLACE.

PRESS ANY KEY WHEN DONE

CE1ME025

Figure 7-8. RT-1539 to ICD Connections Screen

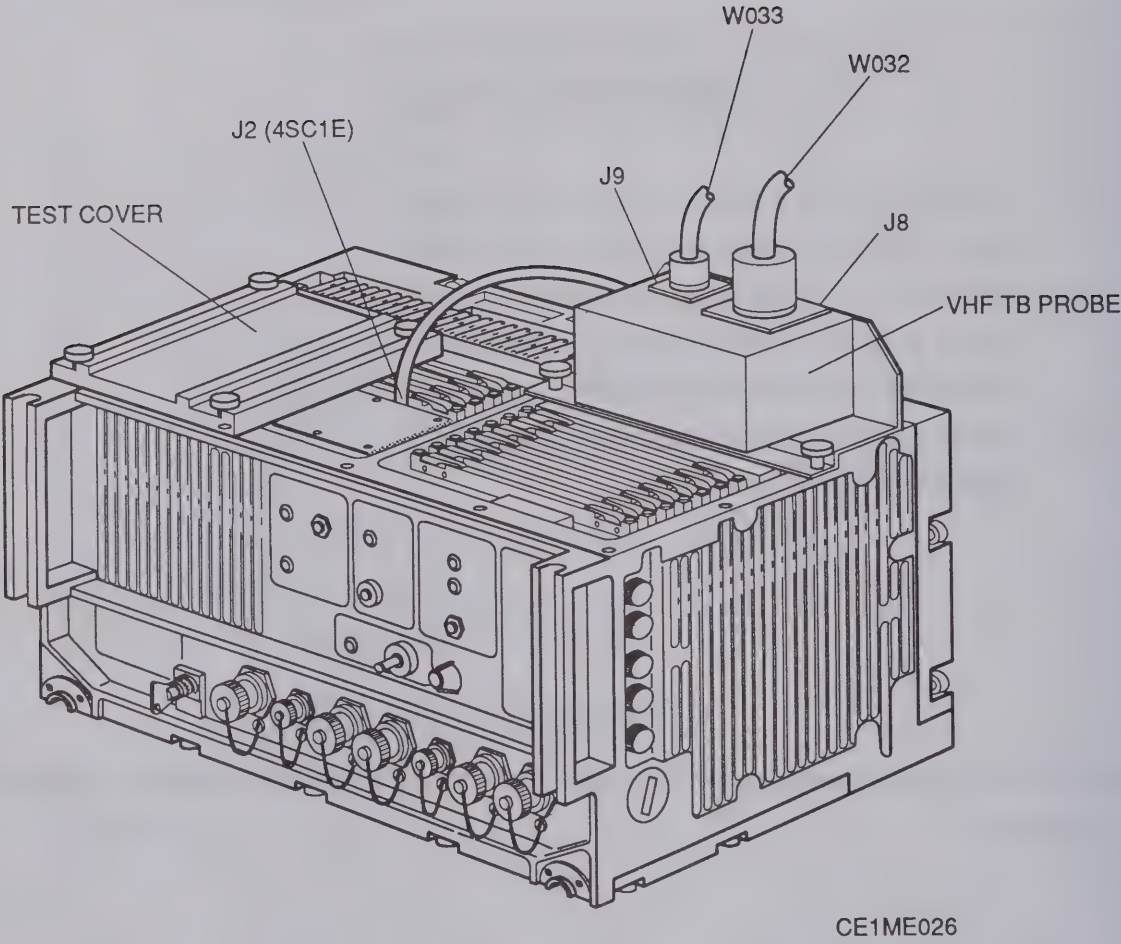


Figure 7-9. Probe Insertion

TESTS CHOICE

1 - TEST GROUP: _

2 - DISCONNECT.

CHOICE: _

CE1ME027

Figure 7-10. Test Selection Screen

TEST GROUP:	
SCENARIO:	MEASURE:
STATE:	RESULT:
ENTER = ABORT SCENARIO	TAB = ABORT TEST GROUP

CE1ME028

Figure 7-11. Test-in-Progress Screen

7-7.2 Disconnection Procedures. Perform the following procedure to disconnect the RT-1539 under test from the test group.

- a. From test selection screen (fig. 7-10), type 2 and press ENTER. Disconnection screen (fig. 7-12) appears on controller display.
- b. Perform actions described on display and BIT as described in paragraph 7-6.1. Press any key when all actions have been performed. After pressing key, test start-up screen (fig. 7-13) appears on controller display.
- c. To discontinue testing, type 2 and press ENTER. End of test screen (fig. 7-14) appears on controller display. To test another RT-1539, type 1 and press ENTER. Diplexer mode selection screen (fig. 7-6) appears on controller display.

NOTE

The controller screens refer to cables with a number preceded by a C. Refer to table 7-2 for a cross-reference list of C numbers to the W numbers on the cables of the AN/USM-626.

Table 7-2. Cable C Numbers to W Numbers Cross-Reference List

DISPLAYED NUMBER	LABELED	FROM/TO
C1	W026	ICD J1 to RT-1539 J1
C2	W027	I D J2 to RT-1539 J2
C4	W028	ICD J4 to RT-1539 J4
C5	W029	ICD J5 to RT-1539 J5
C6	W030	ICD J6 to RT-1539 J6
C7	W031	ICD J7 to RT-1539 J7
C8	W032	ICD J8 to Probe J8
C9	W033	ICD J9 to Probe J9
C10	W023	ICD J10 to Multimeter Input
C12	W025	ICD J12 to Frequency Counter Input
C13	W022	ICD J13 to Signal Generator Output
C14	W020	ICD J14 to Controller Serial Data Port
C17	W006	ICD J17 to AC Power Source (115 VAC)
C16	W035	ICD J16 to DC Power Source (28 VDC)

Table 7-2. Cable C Numbers to W Numbers Cross-Reference List – Continued

DISPLAYED NUMBER	LABELED	FROM/TO
C20	W001	Controller IEEE-488 Data Port to Multimeter Data Port
C21	W003	Multimeter Data Port to Power Meter Data Port
C22	W004	Power Meter Data Port to Signal Generator Data Port
C23	W005	Signal Generator Data Port to Frequency Counter Data Port
C30	N/A	Multimeter to 115 VAC Power Source
C31	N/A	Power Meter to 115 VAC Power Source
C32	N/A	Frequency Counter to 115 VAC Power Source
C33	N/A	Signal Generator to 115 VAC Power Source

7-7.3 Use of Results Display. When a test or scenario is run, the test results table is displayed. Figure 7-4 provides a blank example of a test results table. The name of the test is listed in the left-most column of the display. The second column of the display provides the results of the operation of the software for that portion of the test. The last three columns of the display indicate the results of measured results such as voltage, power (in watts), and frequency (in Hertz). Refer to table 7-3 for a cross reference between the scenario names and the fault finding illustration to be used.

A display of OK in the second column indicates that the program was able to complete without a fatal error and does not indicate that the results of the test are within the specified range. A display of ALA in the second column indicates that an alarm was detected, which would not allow the completion of the running of the test. When ALA is displayed and a number is listed in ALARMS column to indicate the type of alarm that was detected, refer to table 7-4 for the cross reference between the alarm numbers and the fault isolation illustration to be used. If the result is anything other than OK or ALA with a number in the ALARMS column, follow the same procedure as if an incorrect measurement was detected.

In most cases the first fault found on the test results table, without regard to whether it is an alarm condition or out of tolerance measurement, is the one that is used to fault-isolate the problem. The one exception to this rule is the E tests. After the E group of tests is run, compare the results of the EXECUTION REPORT column with table 7-5 to determine which test to run. After running the test determined from table 7-5, use table 7-3 to determine which fault finding illustration to use.

7-7.4 Use of Fault-Isolation Illustrations. During testing, the order of testing is the running of the series of group tests, followed by the running of the faulty test, and in some instances, the running of the scenario upon performing a corrective/isolation action. The results displayed determine which CCAs could be causing the fault. Then use one of the fault finding illustrations to isolate the fault. Use figure 7-15 to assist with the following explanation.

DISCONNECT

- PLEASE UNPLUG ALL THE CABLES EXCEPT C1 AND C6.
- THEN CLOSE THE RT 1539.
- THEN RUN BITE IN MSRT MODE.
- THEN UNPLUG CABLE C1 AND C6.

IF THERE IS ANYTHING WRONG , PLEASE REFER TO TM 12.

PRESS ANY KEY WHEN DONE.

CE1ME029

Figure 7-12. Disconnection Screen

RT 1539 REPAIR SESSION

1 : RUN.

2 : EXIT.

CHOICE: 2

CE1ME030

Figure 7-13. Test Start-Up Screen

Null pointer assignment

A> _

CE1ME031

Figure 7-14. End of Test Screen

CAUTION

Ensure 24 Vdc power source is set to OFF
before removing and/or replacing any CCAs.

NOTE

After removing the battery, 4PC1E CCA, or MO-3/G CCA, it is necessary to reload the crypto key before attempting further testing or troubleshooting.

The top of each illustration is the entry point for that scenario. The previous scenarios and/or tests are assumed to be OK. The CCAs not in direct line with the scenario exit point (where the scenario name is located) should be removed and the scenario should be run again. If the scenario results are now OK, the faulty CCA is among those removed. Replace the CCA with a 1 in the 'CCA Replacement Order' portion of the block first; then rerun the scenario. If the results are OK, the faulty CCA was replaced. If the results are NOK, continue by replacing the CCA with a 2 in the 'CCA Replacement Order' block next. Continue the process until the faulty CCA has been replaced. In all cases, when the fault has not been found by using the fault finding illustrations, refer to the next level of maintenance.

Table 7-3. Scenario to Fault Finding Illustration Cross-Reference

GROUP	TEST	SCENARIO	FIGURE NUMBER	TEST DESCRIPTION
B	B01	B01P12B0	Figure 7-16	Power supply voltage checks
		B01N12B0	Figure 7-17	
		B01P5VB0	Figure 7-18	
		B01N5VB0	Figure 7-19	
		B01P5VR0	Figure 7-20	
		B01P27B0	Figure 7-21	
		B01P27R0	N/A (refer to next level)	
		B01X27V0	Figure 7-22	
		B01W27V0	Figure 7-22	
		B01X50V0	Figure 7-23	
		B01W50V0	Figure 7-23	
	B02	B02SPW50	Figure 7-24	Battery voltage check
	B03	B03LERP0	Figure 7-25	Initialization signals before warm-up
	B05			Frequency checks
		B05XTTCO	Figure 7-26	
		B05RPT10	Figure 7-27	
		B05RPT20	Figure 7-27	
		B05TCK20	Figure 7-28	
		B0515360	Figure 7-29	
		B05DS160	Figure 7-30	
		B05LM160	Figure 7-32	
		B05PS160	Figure 7-31	
		B05LGCK0	Figure 7-33	

Table 7-3. Scenario to Fault Finding Illustration Cross-Reference – Continued

GROUP	TEST	SCENARIO	FIGURE NUMBER	TEST DESCRIPTION
C	C02	C02ATFP0	Figure 7-34	4FP1E autotest
		C02RCFP0	Figure 7-35	4RC1E port test
		C02ALFP0	Figure 7-36	
	C03	C03ATLM0	Figure 7-37	4LM1E autotest
		C03ALLM0	Figure 7-38	4LM1E test
		C03TSLM0	Figure 7-39	4LM1E alarm test
	C04	C04ATDS0	Figure 7-40	4DS1E autotest
		C04ATPS0	Figure 7-40	4PS1E autotest
D	C05	C05ATFD0	Figure 7-41	4FD1E autotest
	C06	C06ATC10	Figure 7-42	4CI1E autotest
	C07	C07ATCS0	Figure 7-43	4CS1E autotest
	D01	D01OFL10	Figure 7-44	4CI1E test 'off line'
		D01LGC10	Figure 7-45	
	D02	D02BDSC0	Figure 7-46	4PS1E/4DS1E loop test with error correction
		D02BDSS0	Figure 7-46	4PS1E/4DS1E loop test without error correction
		D02ALDS0	Figure 7-46	
	D03	D03LMDS0	Figure 7-47	4LM1E-4PS1E/4DS1E loop test
	D04	D04FDDS0	Figure 7-48	4FD1E-4DS1E loop test
	D05	D05CSSE0	Figure 7-49	4CS1E - 4PS1E/4DS1E loop test
E	E01		MSRT - Figure 7-52 RAU - Figure 7-53	RAU Mode sensitivity, lowband
	E02		MSRT - Figure 7-54 RAU - Figure 7-55	MSRT Mode sensitivity, lowband

Table 7-3. Scenario to Fault Finding Illustration Cross-Reference – Continued

GROUP	TEST	SCENARIO	FIGURE NUMBER	TEST DESCRIPTION
E (Cont)	E03		MSRT - Figure 7-58 RAU - Figure 7-59	MSRT Mode sensitivity, highband
	E04		Figure 7-60	Triggers 1 and 2
	E05		Figure 7-68	Trigger 3
	E06		Figure 7-61	MSRT mode carrier
	E07		Figure 7-62	MSRT mode reduced sensitivity
	E08		Figure 7-63	RAU mode carrier
	E09		Figure 7-64	Power (level 2) and frequency check
	E10		Figure 7-65	Radio loop - radio sanction
	E11		Figure 7-67	Power (level 1) check
	E14		Figure 7-71	NZR modulation
	E15		Figure 7-72	Radio loop - logic sanction
	E50		MSRT - Figure 7-50 RAU - Figure 7-51	Lowband sensitivity
	E51		MSRT - Figure 7-56 RAU - Figure 7-57	Highband sensitivity and power
	E52		Figure 7-66	Power test
	E53		Figure 7-73	Trigger 3 test
	E54		MSRT - Figure 7-69 RAU - Figure 7-70	Power (level 0) check

Table 7-4. Alarm Number to Fault Finding Illustration Cross-Reference

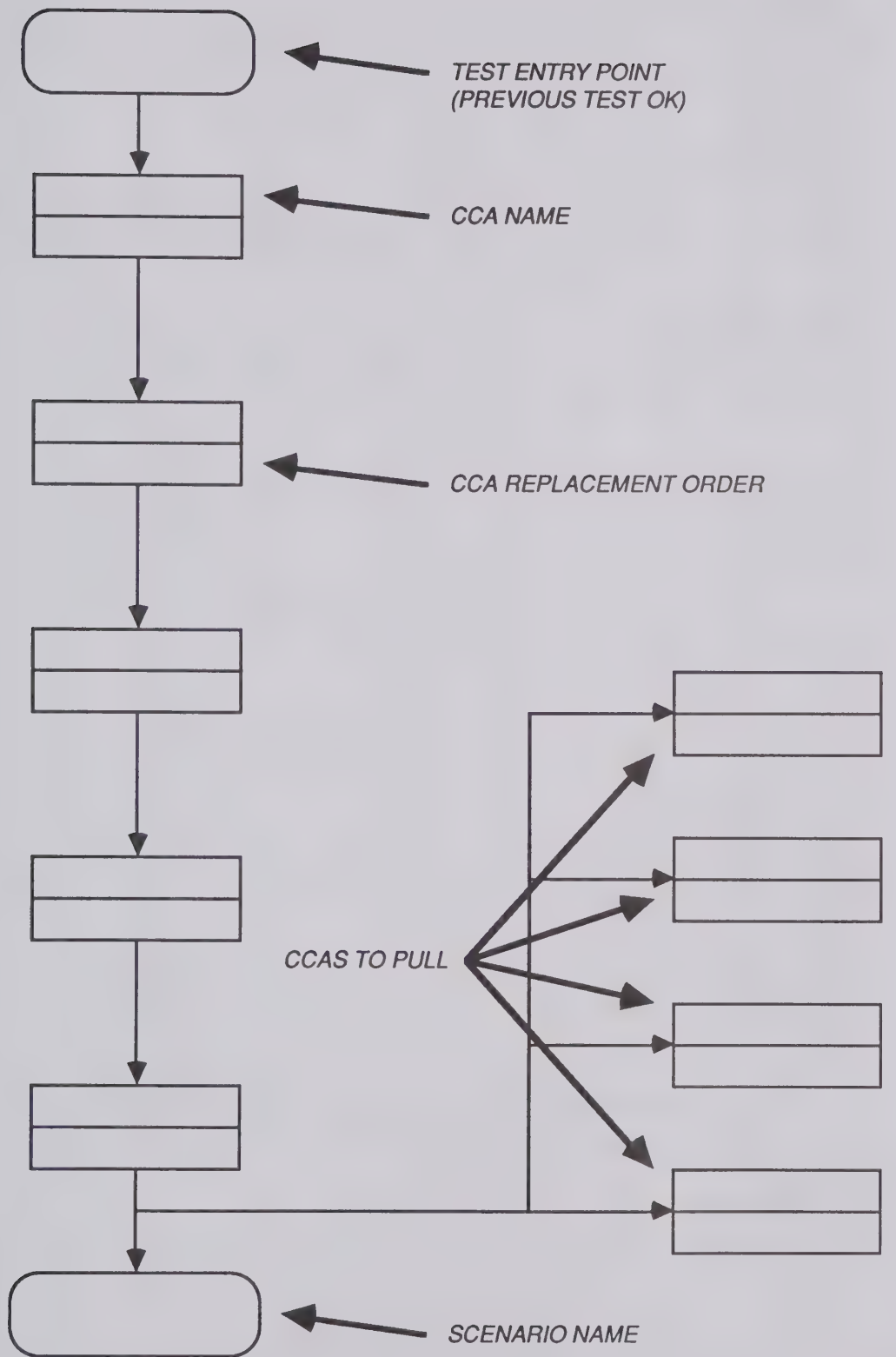
CCA IN ALARM	ALARM NUMBER	MESSAGE NAME	FIGURE NUMBER	ALARM DESCRIPTION
4CI1E	CI 1	CIM_INRAU_ALA	Figure 7-74	L-INRAU line error
	CI 2	CIM_LGC_ALA	Figure 7-75	L-LGC line error
	CI 3	CIM_BPS_ALA	Figure 7-76	L_BPS line error
	CI 4	CIM_L1A_ALA	Figure 7-77	L_1A line error
	CI 5	CIM_LPG_ALA	Figure 7-78	L_LPG line error
	CI 6	CIM_EF_ALA	Figure 7-79	L_EF line error
	CI 8	CIM_50V_ALA	Figure 7-80	50V supply failure
	CI 9	CIM_MCU_ALA	Figure 7-81	MCU (Mobile COMSEC Unit)
	CI A	CIM_FIFO_ALA	Figure 7-82	FIFO CPU <--> CI outflow alarm
	CI C	CIM_OFFL_FULL	Figure 7-81	L_DOR line error during off-line
	CI E	CIM_ONL_ALA	Figure 7-81	L_CS line error during on-line
	CI F	CIM_LG_ALA	Figure 7-83	Time-out on LG1 response
4CS1E	CS 1	CSM_ALR_SC	Figure 7-84	Synthesizer clocks
	CS 2	CSM_ALR_ST	Figure 7-85	Synthesizer : transmit part
	CS 3	CSM_ALR_SR	Figure 7-86	Synthesizer : receive part
	CS 4	CSM_ALR_SM	Figure 7-87	Synthesizer : modulator
	CS 5	CSM_ALR_SY_MT	Figure 7-88	Synthesizer : modulator + transmit part
	CS 6	CSM_ALR_SY_MC	Figure 7-89	Synthesizer : modulator + clock
	CS 7	CSM_ALR_SY_MCT	Figure 7-90	Synthesizer : modulator + clock + transmit part
	CS 8	CSM_ALR_ALL_SYNT	Figure 7-91	Synthesizer general alarm
	CS 9	CSM_ALR_SYNTHE	Figure 7-92	Other synthesizer alarms
	CS A	CSM_ALR_DX	Figure 7-93	Diplexer
	CS B	CSM_ALR_DPOW	Figure 7-94	Insufficient direct power
	CS C	CSM_ALR_VSWR	Figure 7-95	VSWR > 4 in RAU mode
	CS D	CSM_ALR_CS	Figure 7-96	Other CS alarms
4DS1E	DS 4	DSM_FIFO_FULL	Figure 7-97	FIFO CPU <---> DS outflow alarm

Table 7-4. Alarm Number to Fault Finding Illustration Cross-Reference – Continued

CCA IN ALARM	ALARM NUMBER	MESSAGE NAME	FIGURE NUMBER	ALARM DESCRIPTION
4FD1E	FD 1	FDM_FIFO_FULL	Figure 7-98	FIFO CPU <- -> FD outflow alarm
	4FP1E			
	FP 1	FPM_BSSF	Figure 7-99	Faulty Switch
	FP 3	FPM_RCU_FAIL	Figure 7-100	Faulty link with RCU
	FP 4	FPM_FSP	Figure 7-101	Switch in forbidden position
	FP5	FPM_FIFO_FULL	Figure 7-102	FIFO CPU <- -> FD outflow alarm
4LM1E	LM 1	LMM_MLM_FIFO_FULL	Figure 7-103	FIFO CPU - - -> LM outflow
	LM 2	LMM_LMM_FIFO_FULL	Figure 7-103	FIFO CUP <- - LM outflow
	LM 3	LMM_MLY_FIFO_FULL	Figure 7-103	FIFO LM - -> LY outflow
	LM 4	LMM_LYM_FIFO_FULL	Figure 7-103	FIFO LM <- - LY outflow
	LM 5	LMM_DEM_FIFO_FULL	Figure 7-103	LY - modem interface FIFO
	4PS1E			
	PS 4	PSM_FIFO_FULL	Figure 7-104	FIFO CPU <- -> PS outflow

Table 7-5. E Group Test Results to E Test Cross-Reference

E 0 1	E 0 2	E 0 3	E 0 4	E 0 5	E 0 6	E 0 7	E 0 8	E 0 9	E 1 0	E 1 1	E 1 2	E 1 3	E 1 4	E 1 5	TEST TO RUN
N	O	X	X	X	X	X	X	X	X	X	X	X	X	X	E01
N	N	X	X	X	X	X	X	X	X	X	X	X	X	X	E50
O	N	X	X	X	X	X	X	X	X	X	X	X	X	X	E02
N	N	N	O	O	O	O	O	O	O	O	O	O	O	N	E54
O	O	N	X	X	X	X	X	X	X	X	X	N	X	X	E51
O	O	N	X	X	X	X	X	X	X	X	X	O	X	X	E03
O	O	O	N	X	X	X	X	X	X	X	X	X	X	X	E04
O	O	O	O	N	O	O	O	O	O	O	X	X	X	X	E05
O	O	O	O	X	N	X	X	X	X	X	X	X	X	X	E06
O	O	O	O	X	O	N	X	X	X	X	X	X	X	X	E07
O	O	O	O	X	O	O	N	X	X	X	X	X	X	X	E08
O	O	O	O	X	O	O	O	N	O	N	N	N	X	X	E52
O	O	O	O	X	O	O	O	N	X	X	X	X	X	X	E09
O	O	O	O	X	O	O	O	O	N	X	X	X	X	X	E10
O	O	O	O	X	O	O	O	O	O	N	X	X	X	X	E11
O	O	O	O	O	O	O	O	O	O	O	N	N	X	X	E53
O	O	O	O	O	O	O	O	O	O	O	O	O	N	X	E14
O	O	O	O	O	O	O	O	O	O	O	O	O	O	N	E15



CE1ME032

Figure 7-15. Fault Finding Illustration Sample

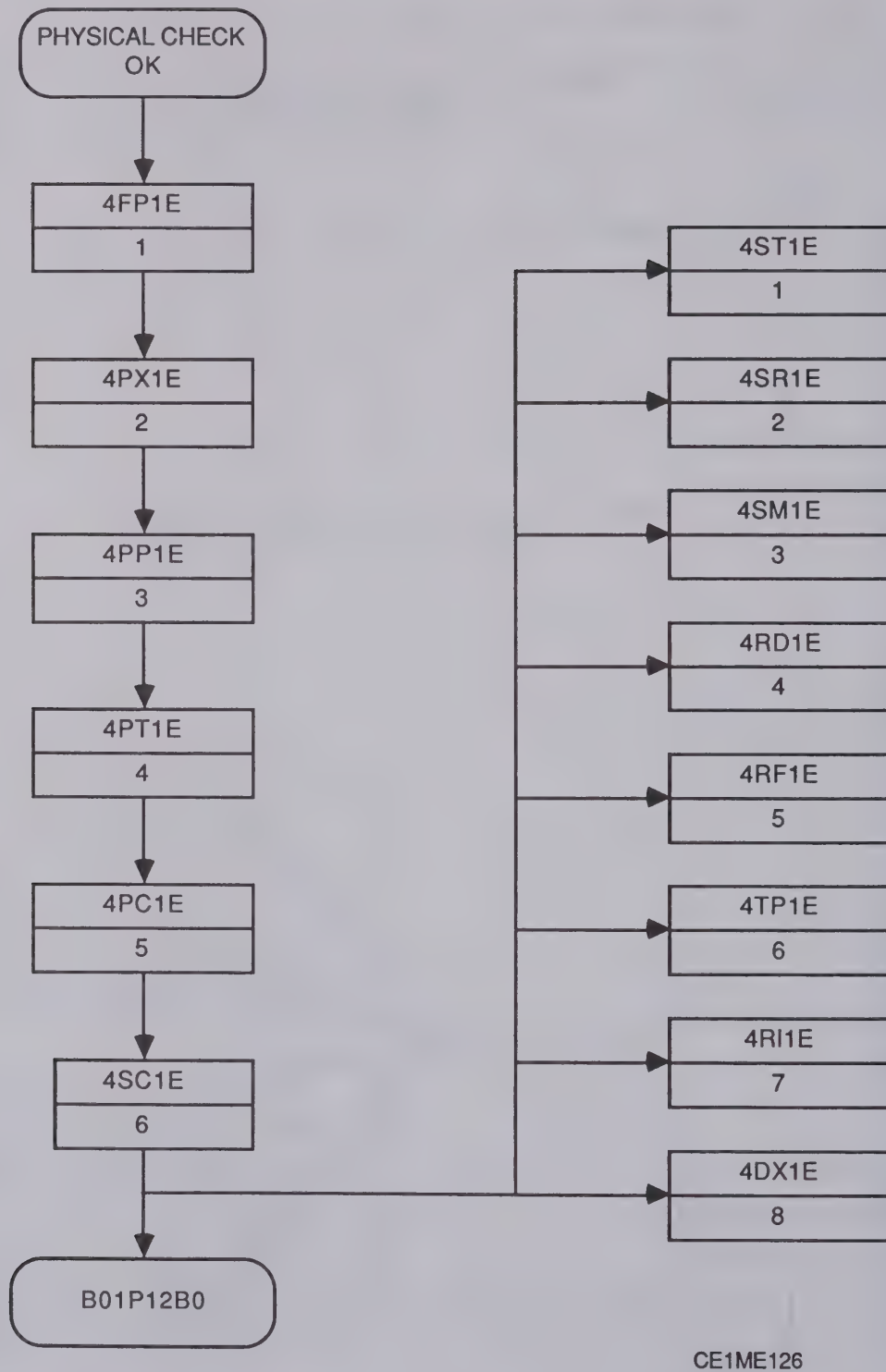
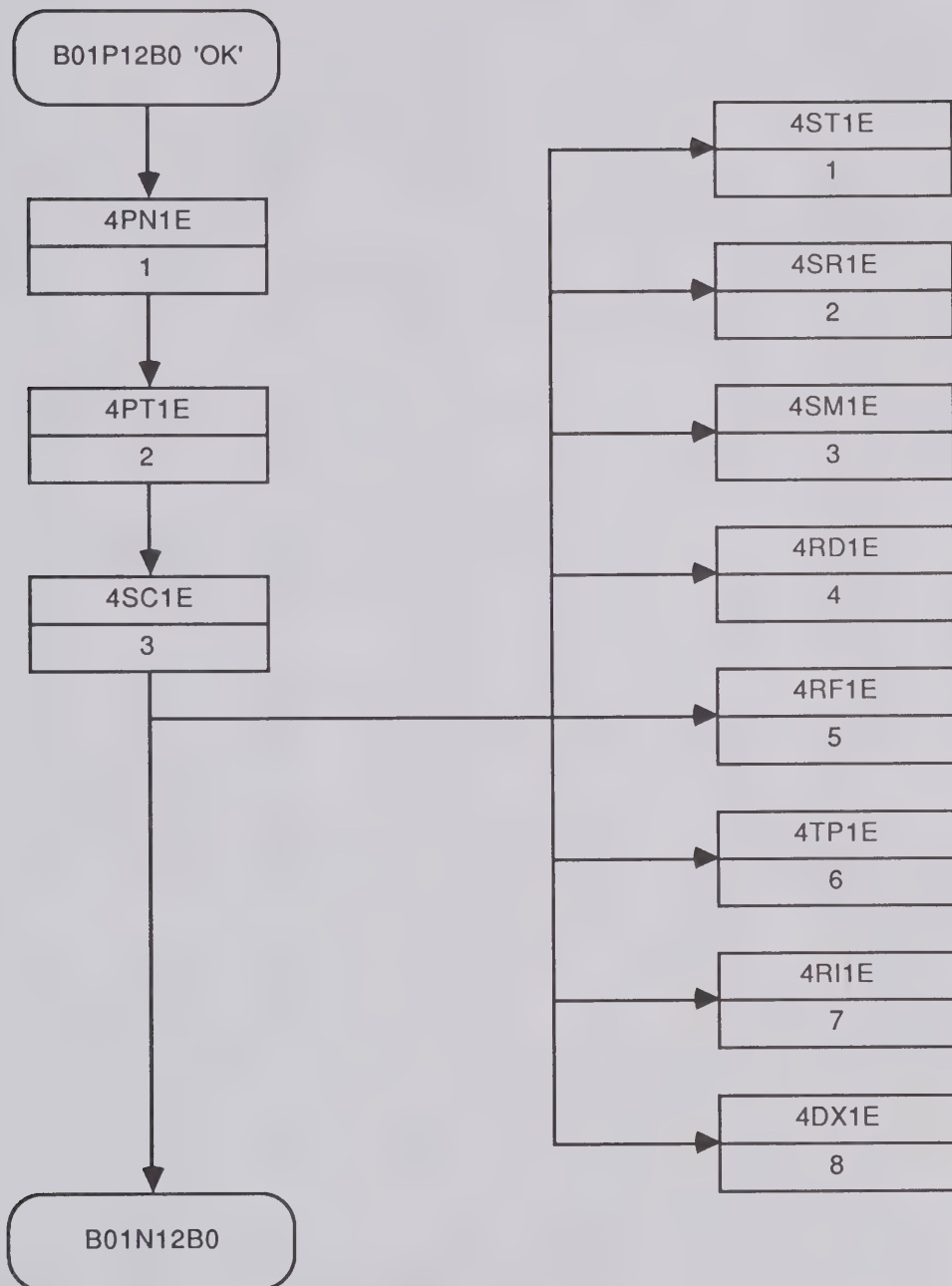
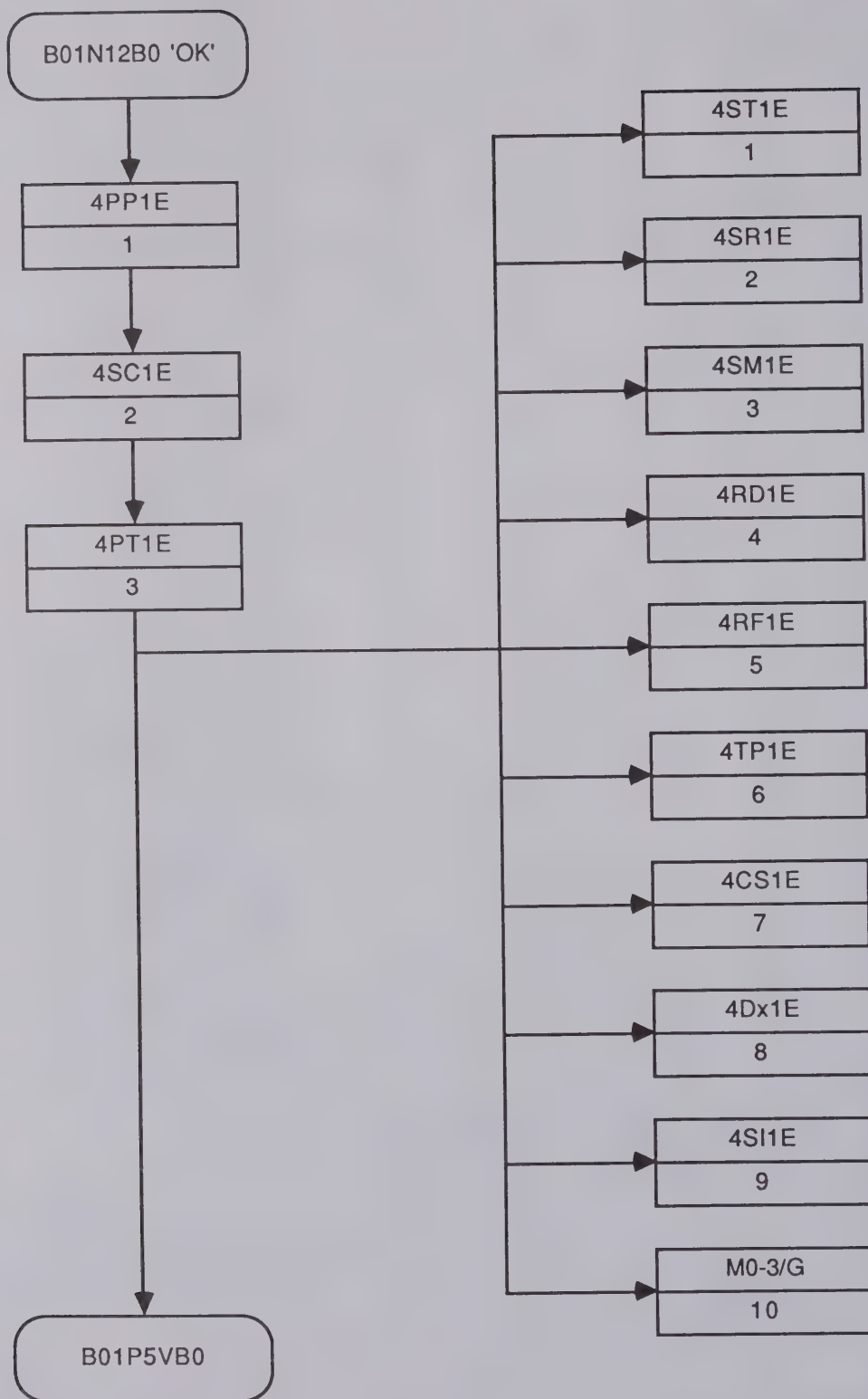


Figure 7-16. B01P12B0 Fault



CE1ME127

Figure 7-17. B01N12B0 Fault



CE1ME035

Figure 7-18. B01P5VB0 Fault

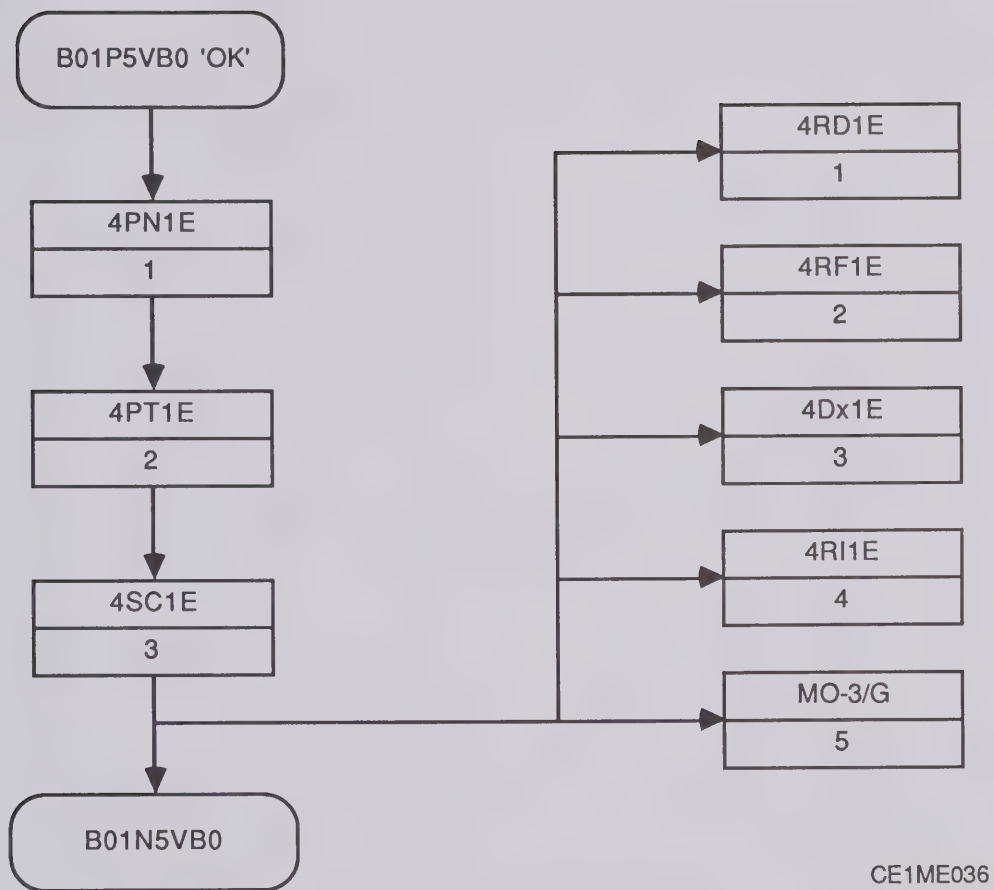


Figure 7-19. B01N5VB0 Fault

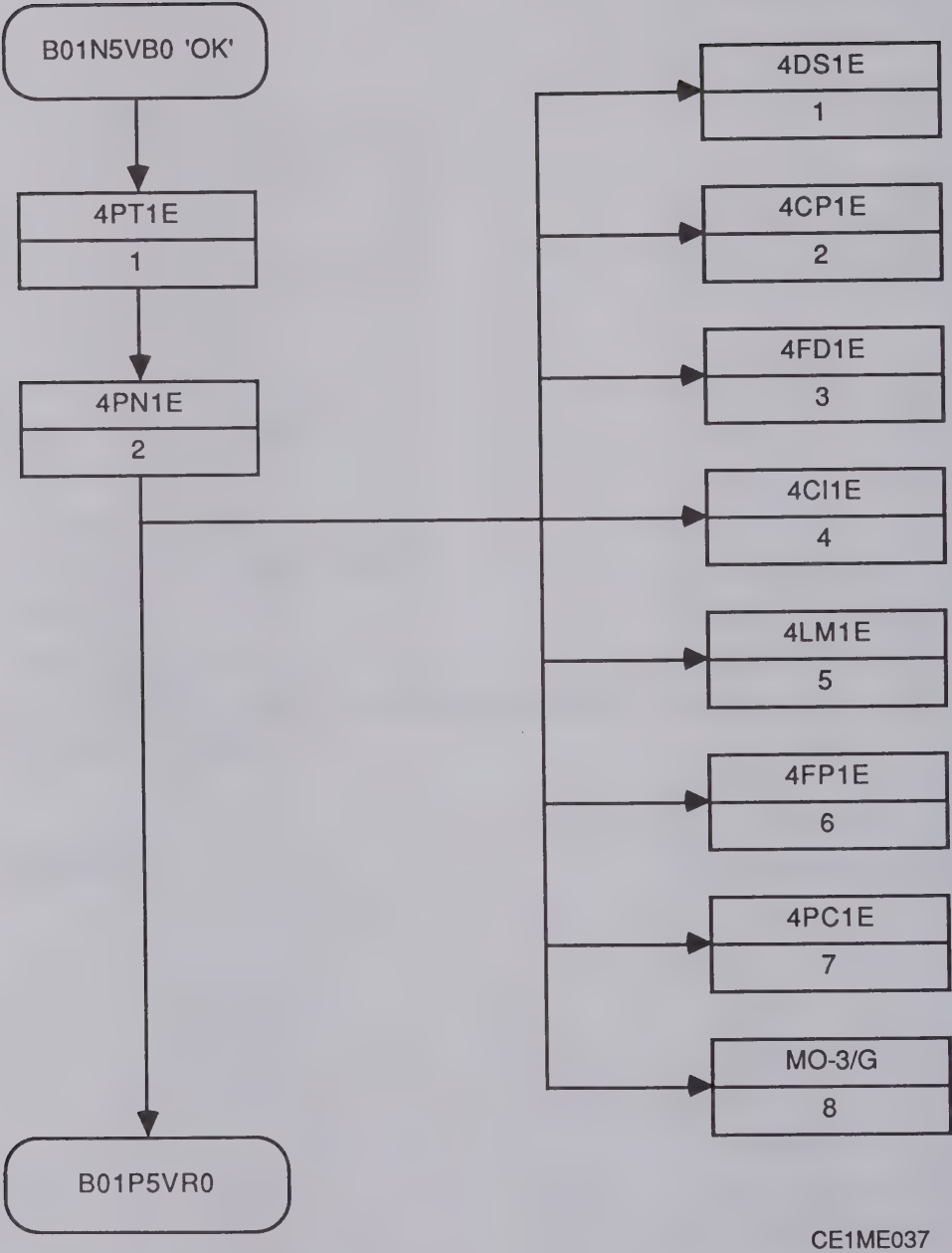


Figure 7-20. B01P5VR0 Fault

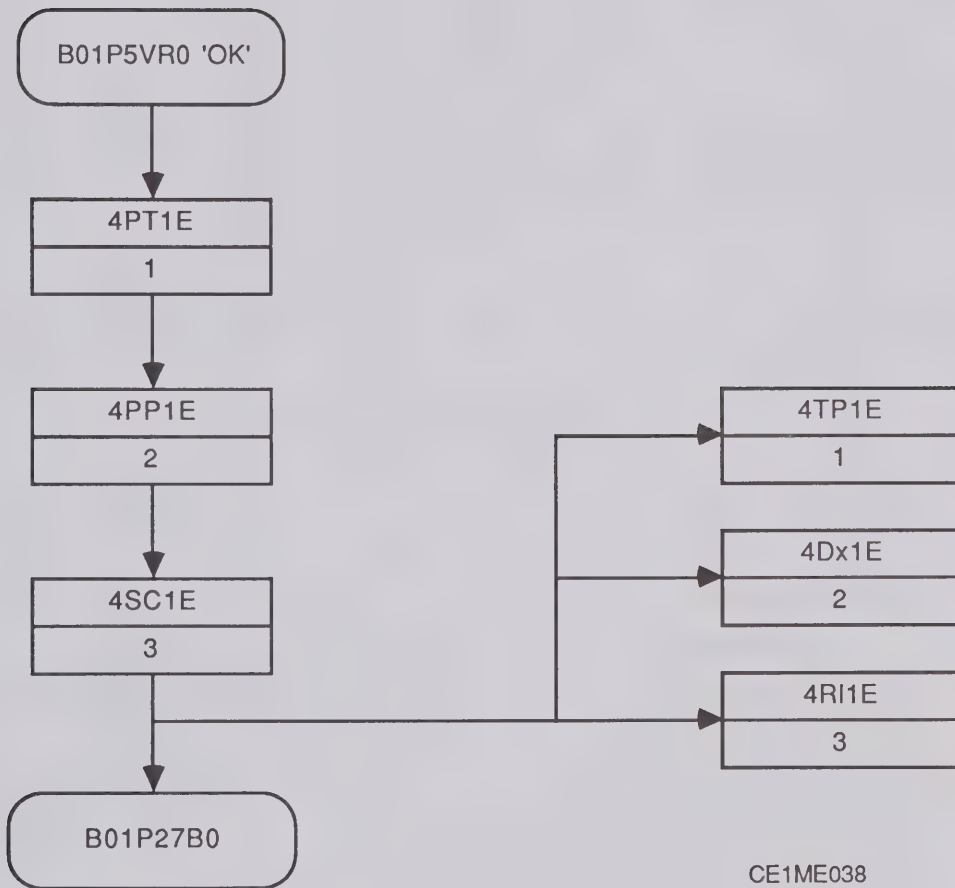


Figure 7-21. B01P27B0 Fault

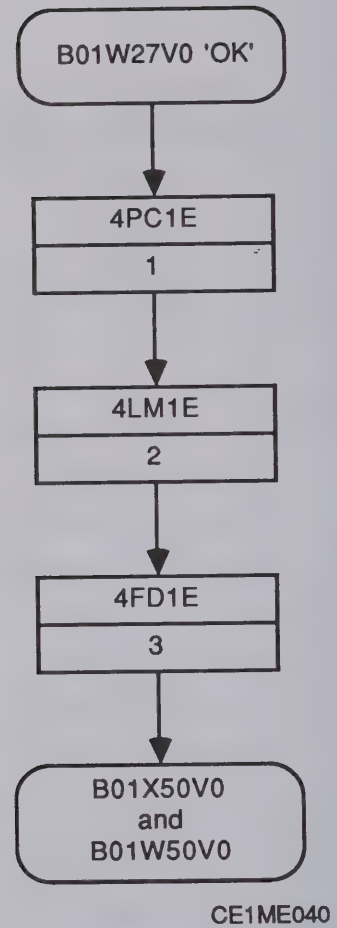
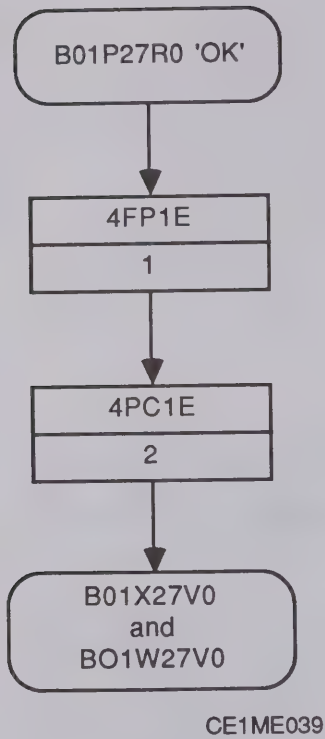


Figure 7-22. B01W27V0 Fault and B01X27V0 Fault

Figure 7-23. B01W50V0 Fault and B01X50V0 Fault

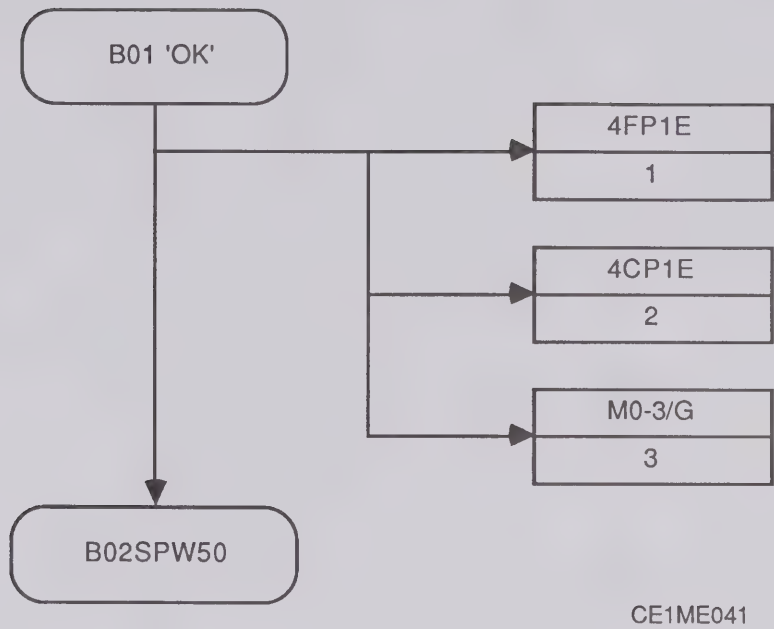


Figure 7-24. B02SPW50 Fault

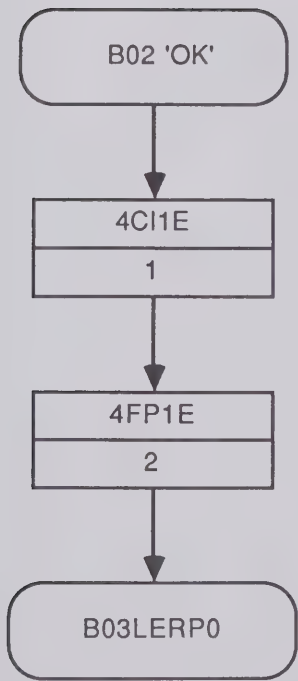


Figure 7-25. B03LERP0 Fault

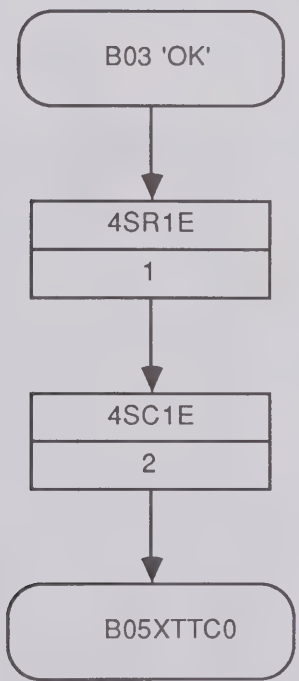


Figure 7-26. B05XTTC0 Fault

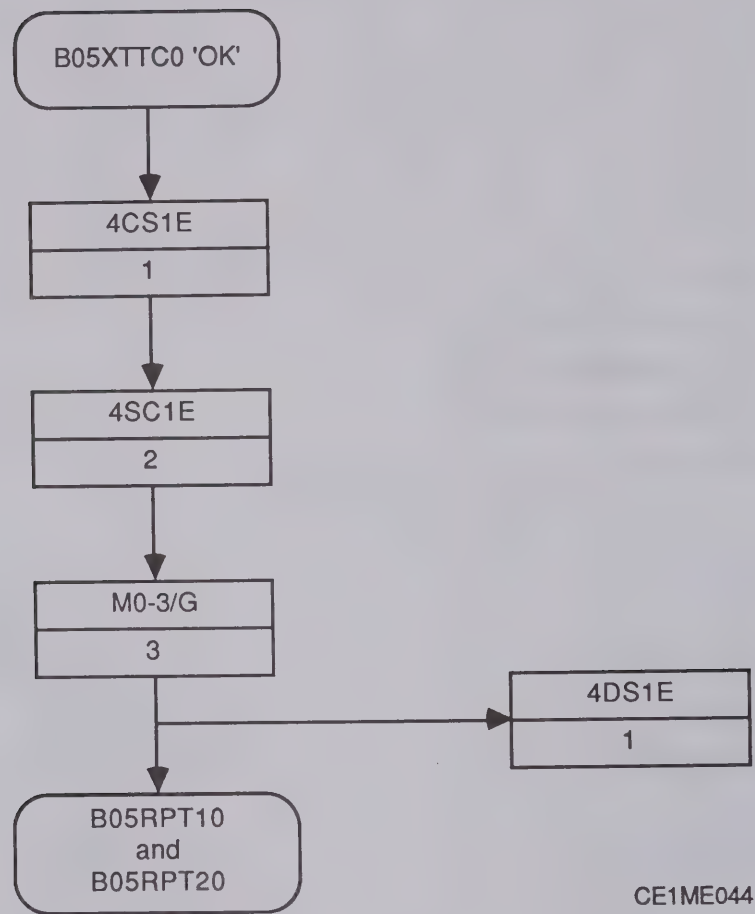


Figure 7-27. B05RPT10 Fault and B05RPT20 Fault

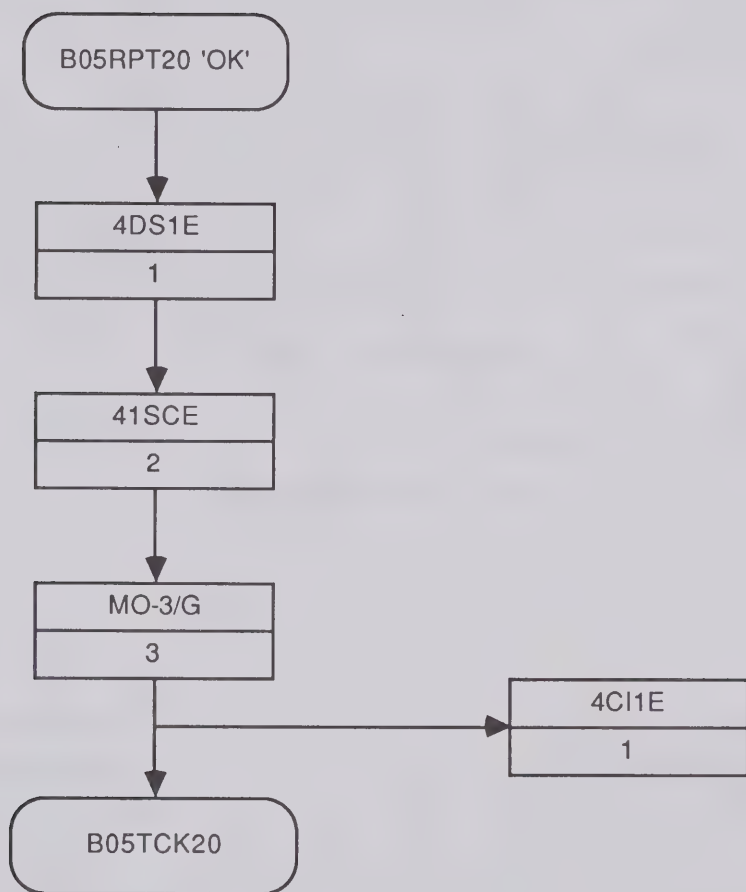


Figure 7-28. B05TCK20 Fault

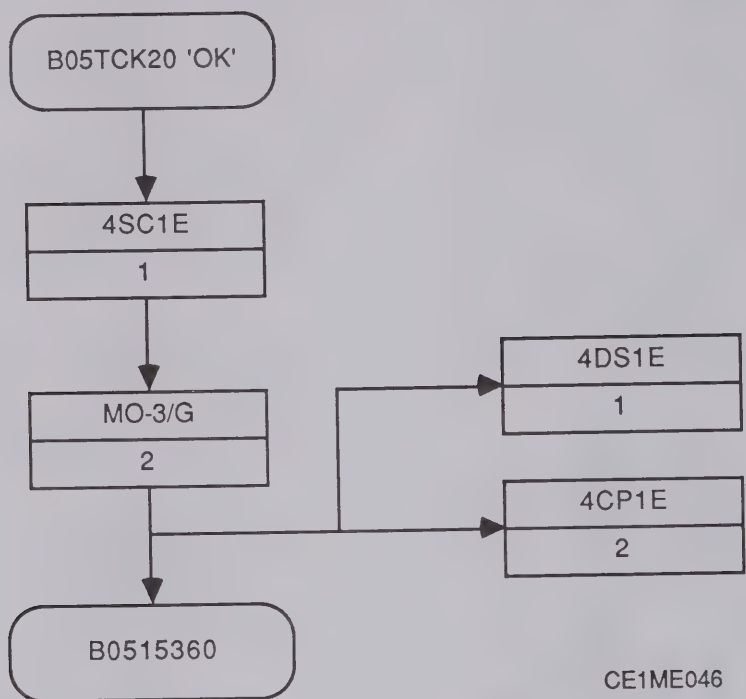


Figure 7-29. B0515360 Fault

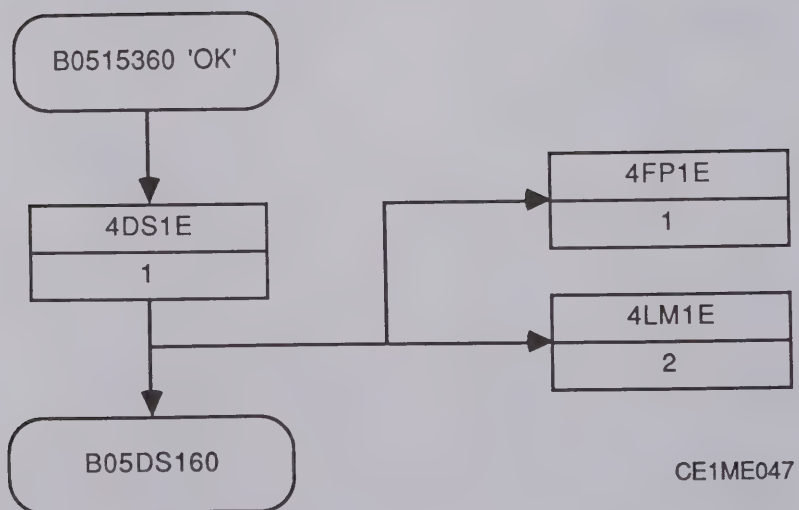


Figure 7-30. B05DS160 Fault

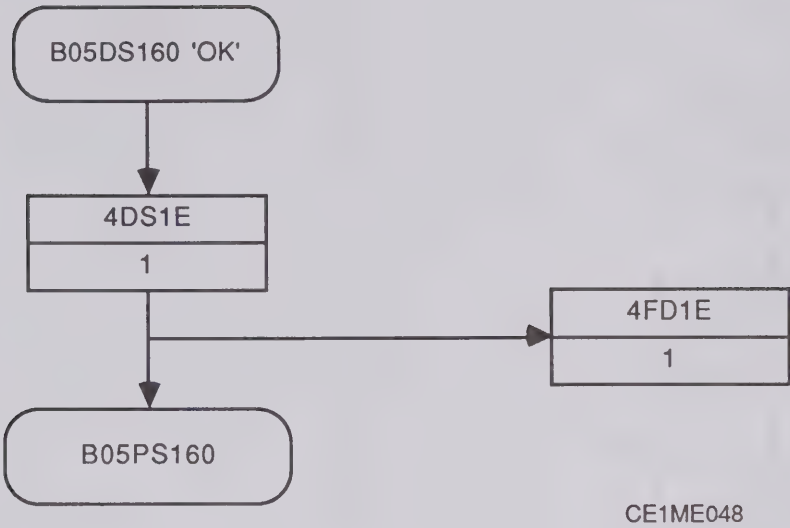


Figure 7-31. B05PS160 Fault

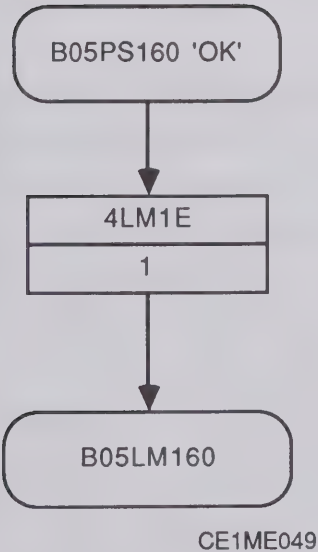


Figure 7-32. B05LM160 Fault

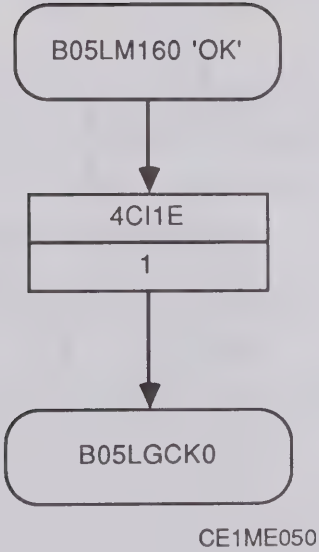
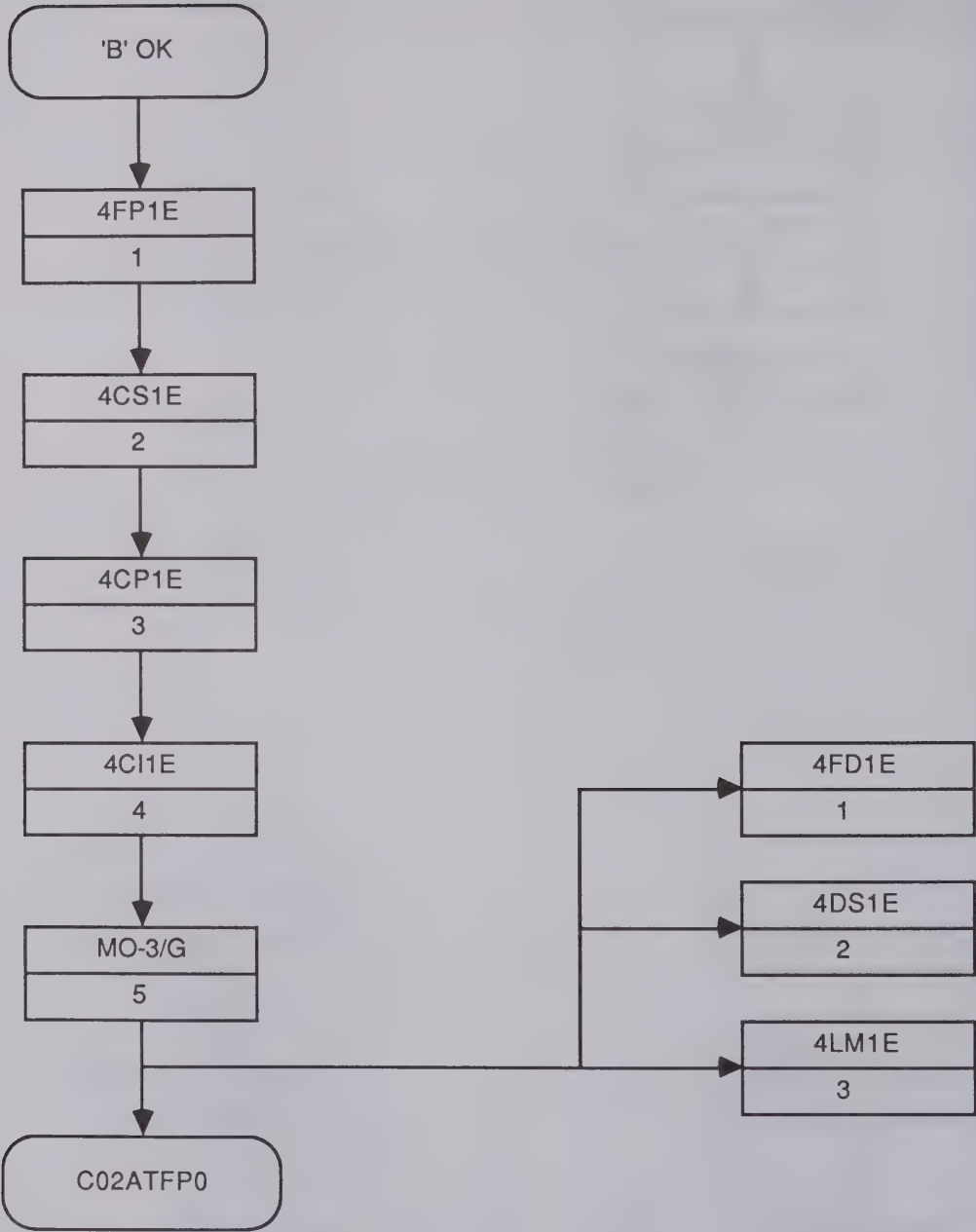


Figure 7-33. B05LGCK0 Fault



CE1ME051

Figure 7-34. C02ATFP0 Fault

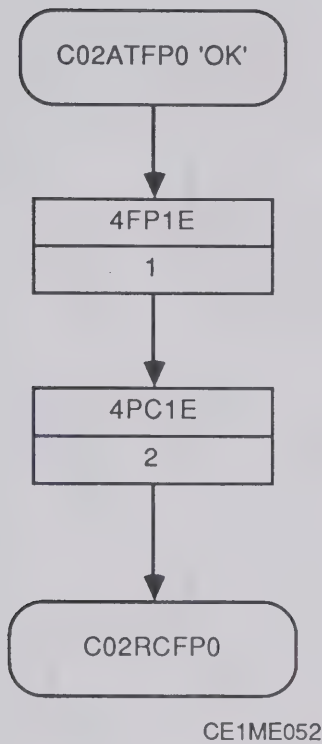


Figure 7-35. C02RCFP0 Fault

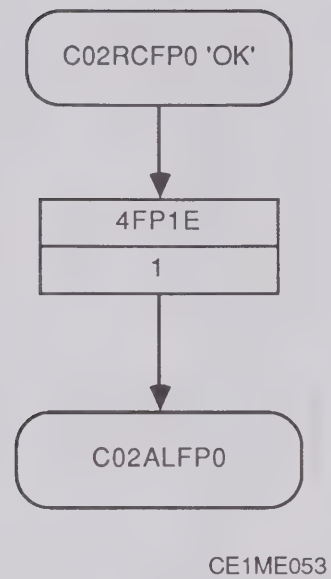


Figure 7-36. C02ALFP0 Fault

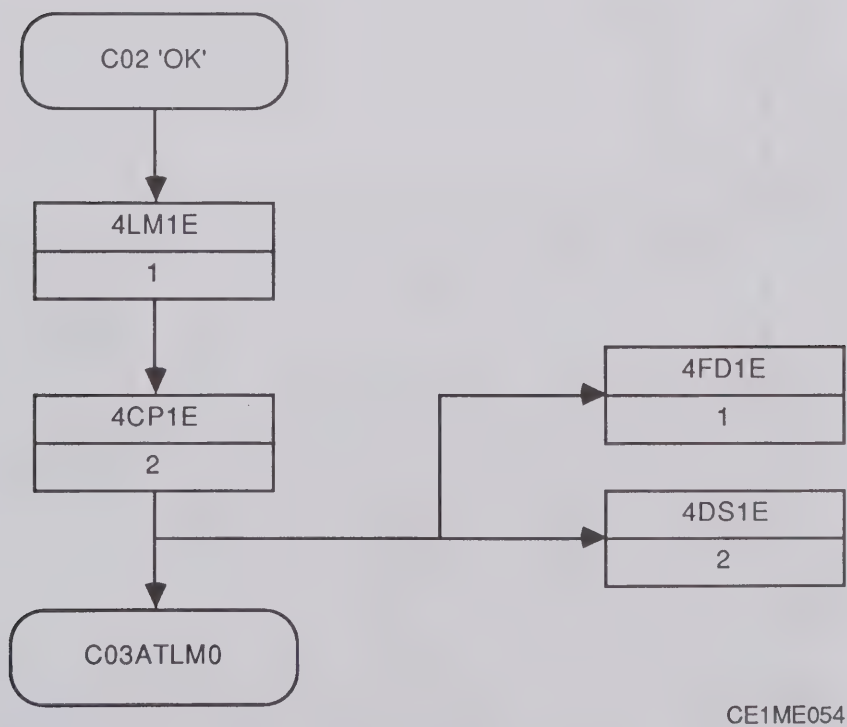


Figure 7-37. C03ATLM0 Fault

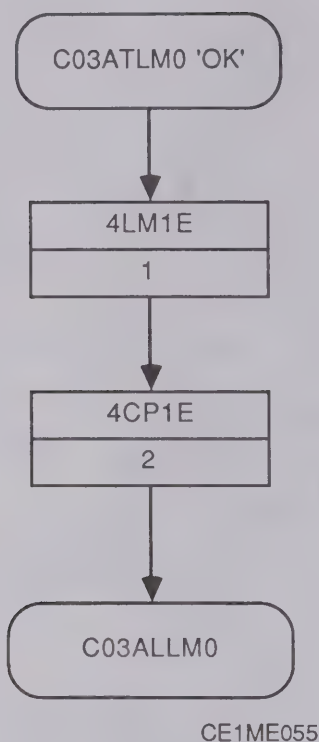


Figure 7-38. C03ALLM0 Fault

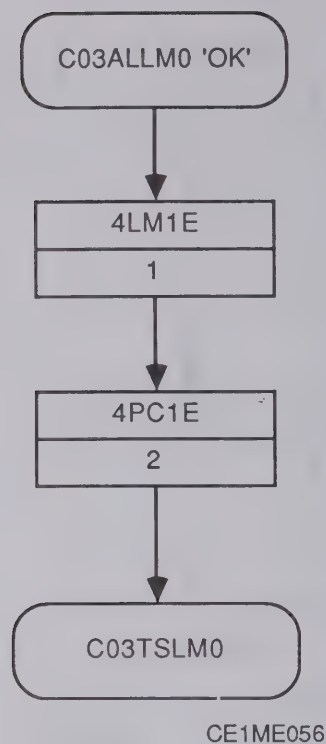


Figure 7-39. C03TSLM0 Fault

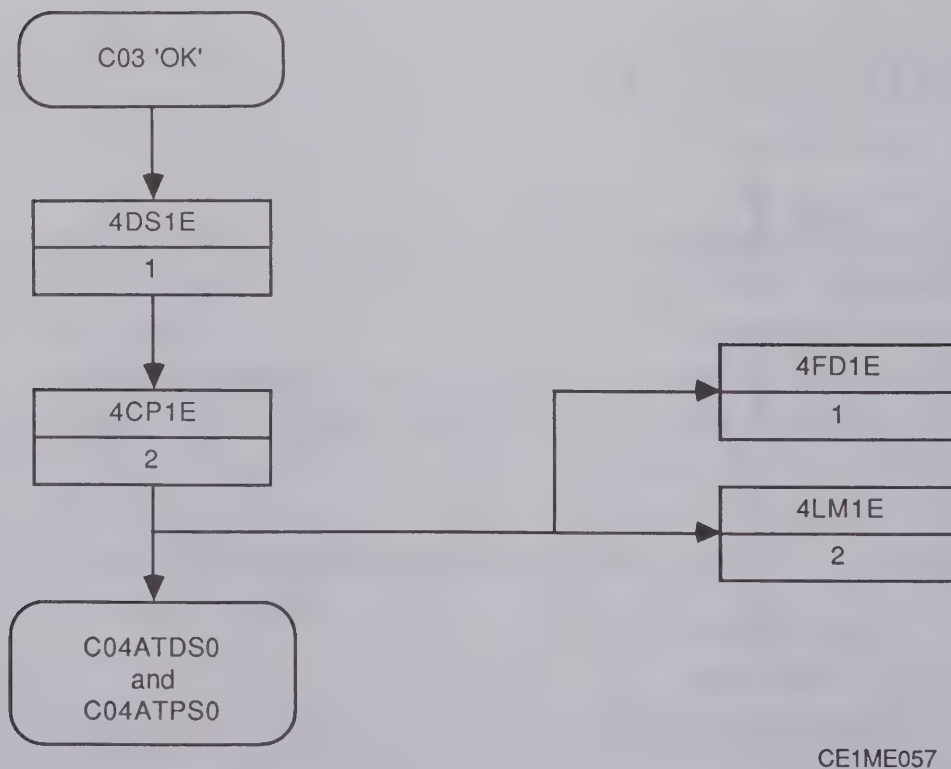


Figure 7-40. C04ATDS0 Fault and C04ATPS0 Fault

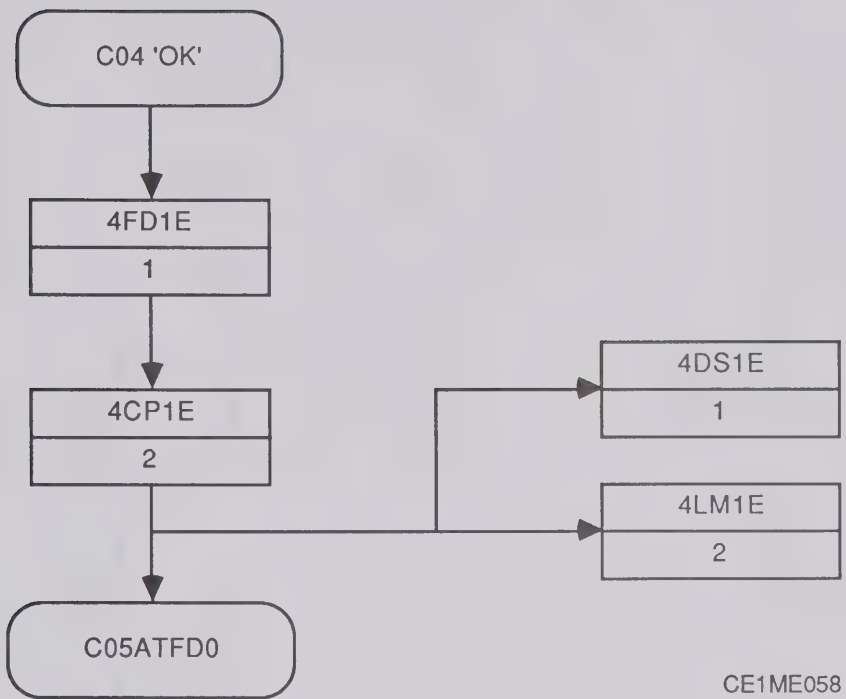


Figure 7-41. C05ATFD0 Fault

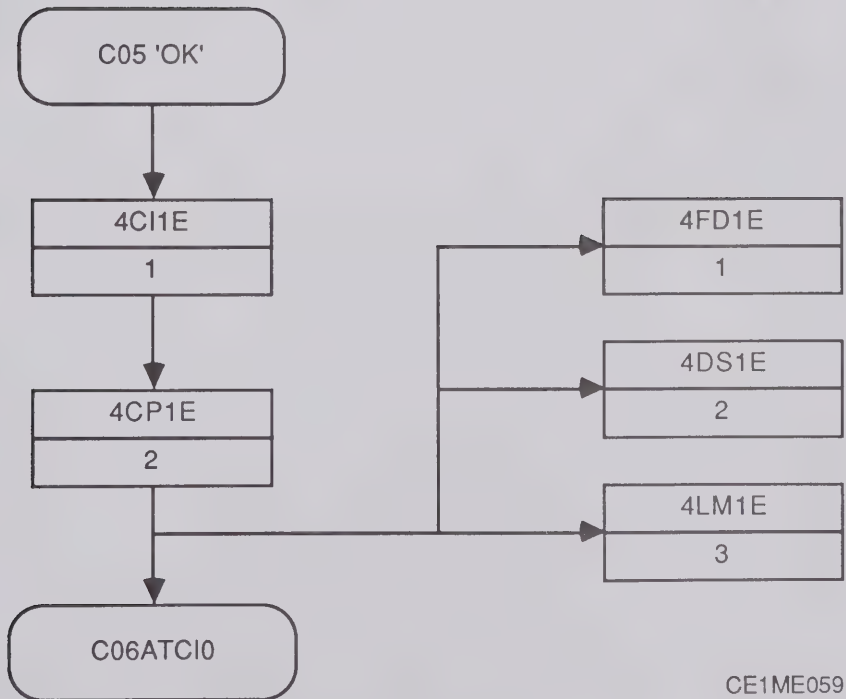


Figure 7-42. C06ATCI0 Fault

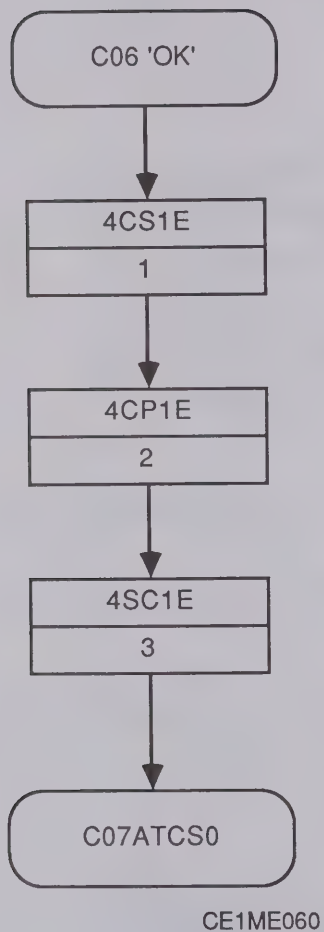


Figure 7-43. C07ATCS0 Fault

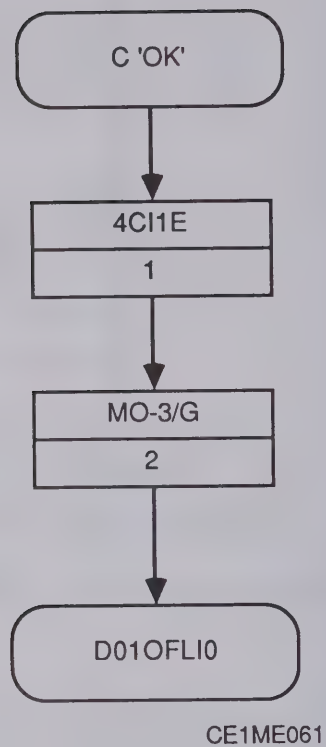


Figure 7-44. D01OFLI0 Fault

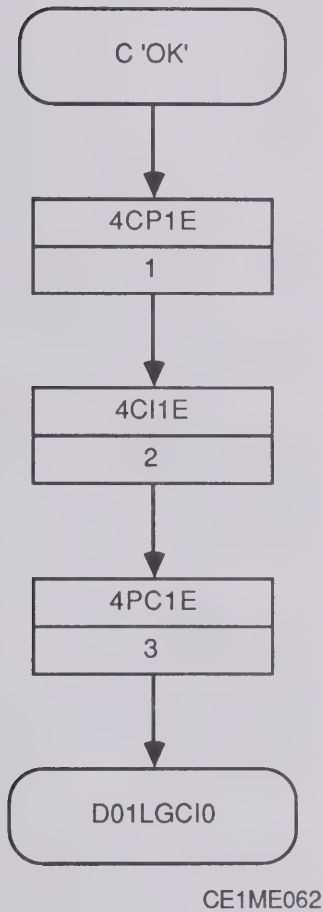


Figure 7-45. D01LGCIO Fault

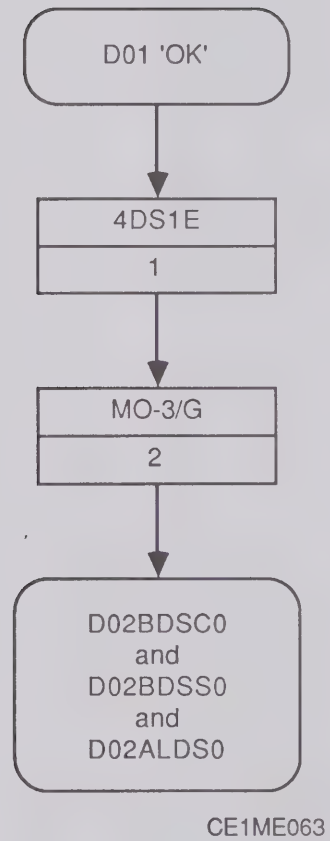


Figure 7-46. D02BDSC0 Fault and D02BDSS0 Fault and D02ALDS0 Fault

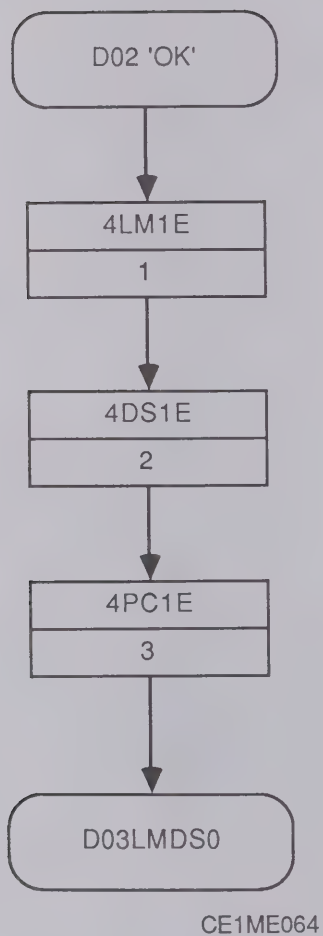


Figure 7-47. D03LMDS0 Fault

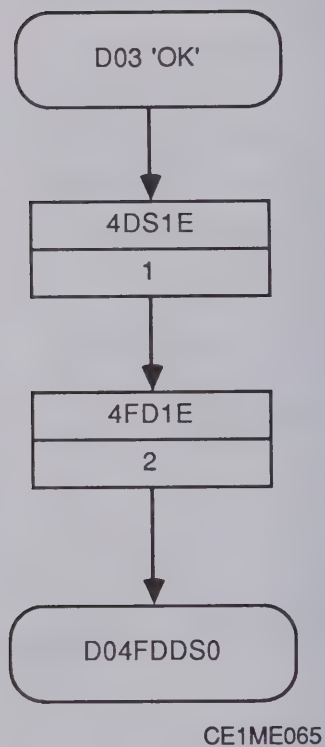
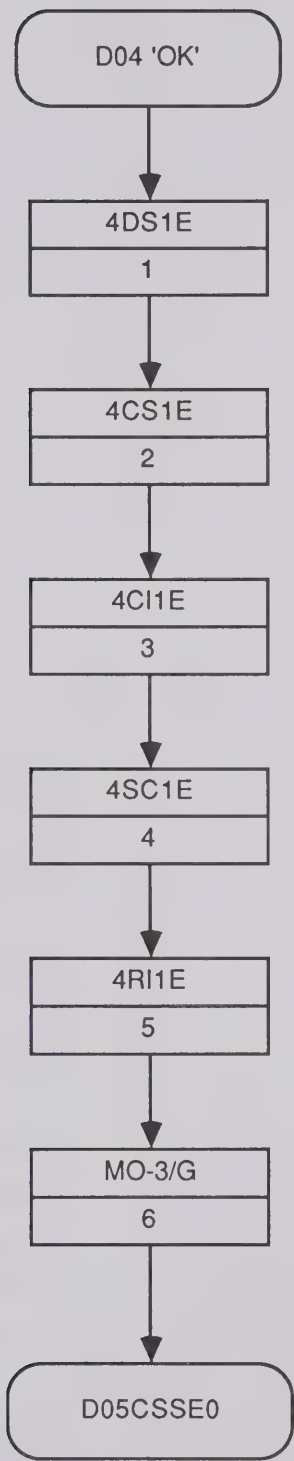
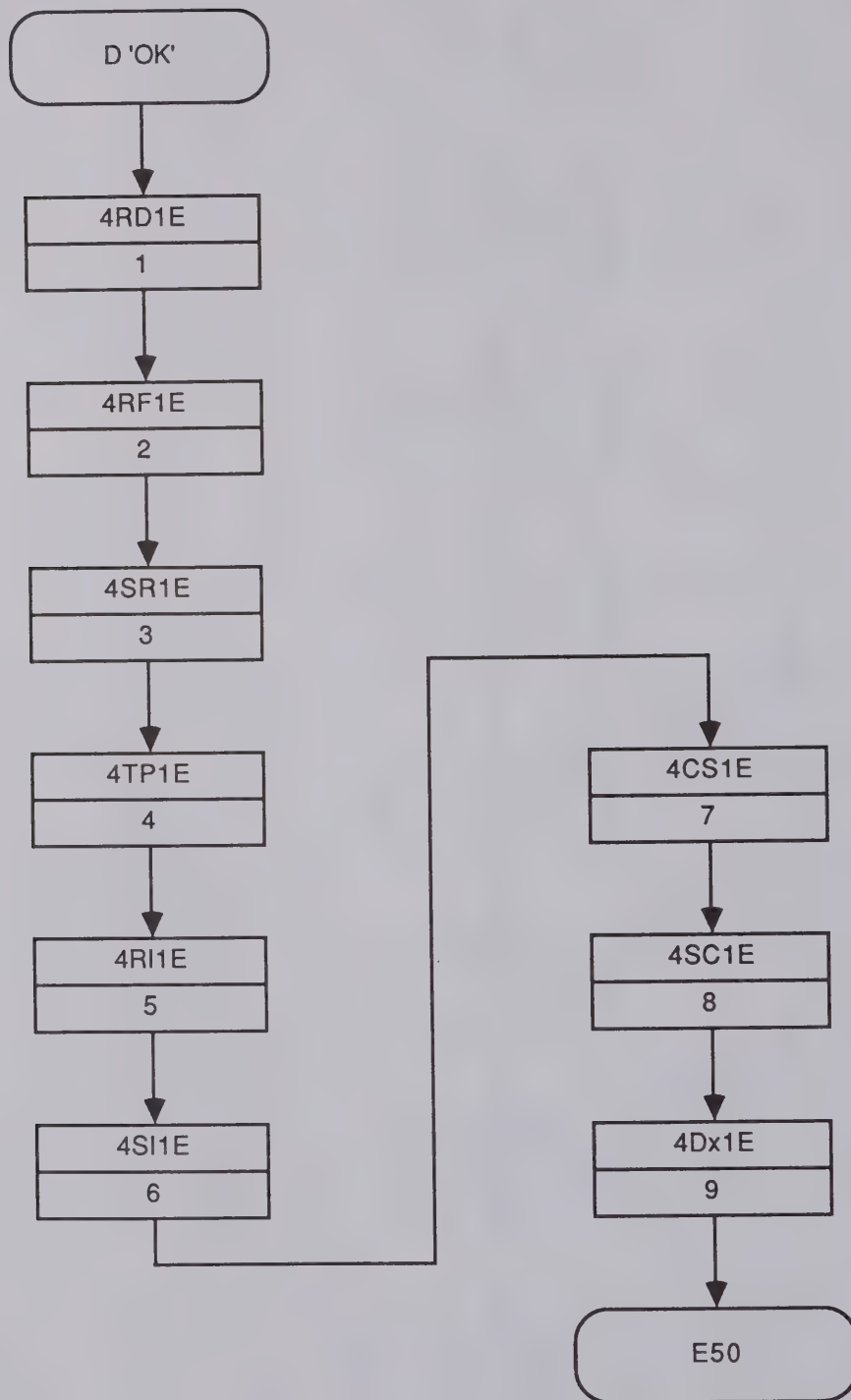


Figure 7-48. D04FDDS0 Fault



CE1ME066

Figure 7-49. D05CSSE0 Fault



CE1ME067

Figure 7-50. MSRT E50 Fault

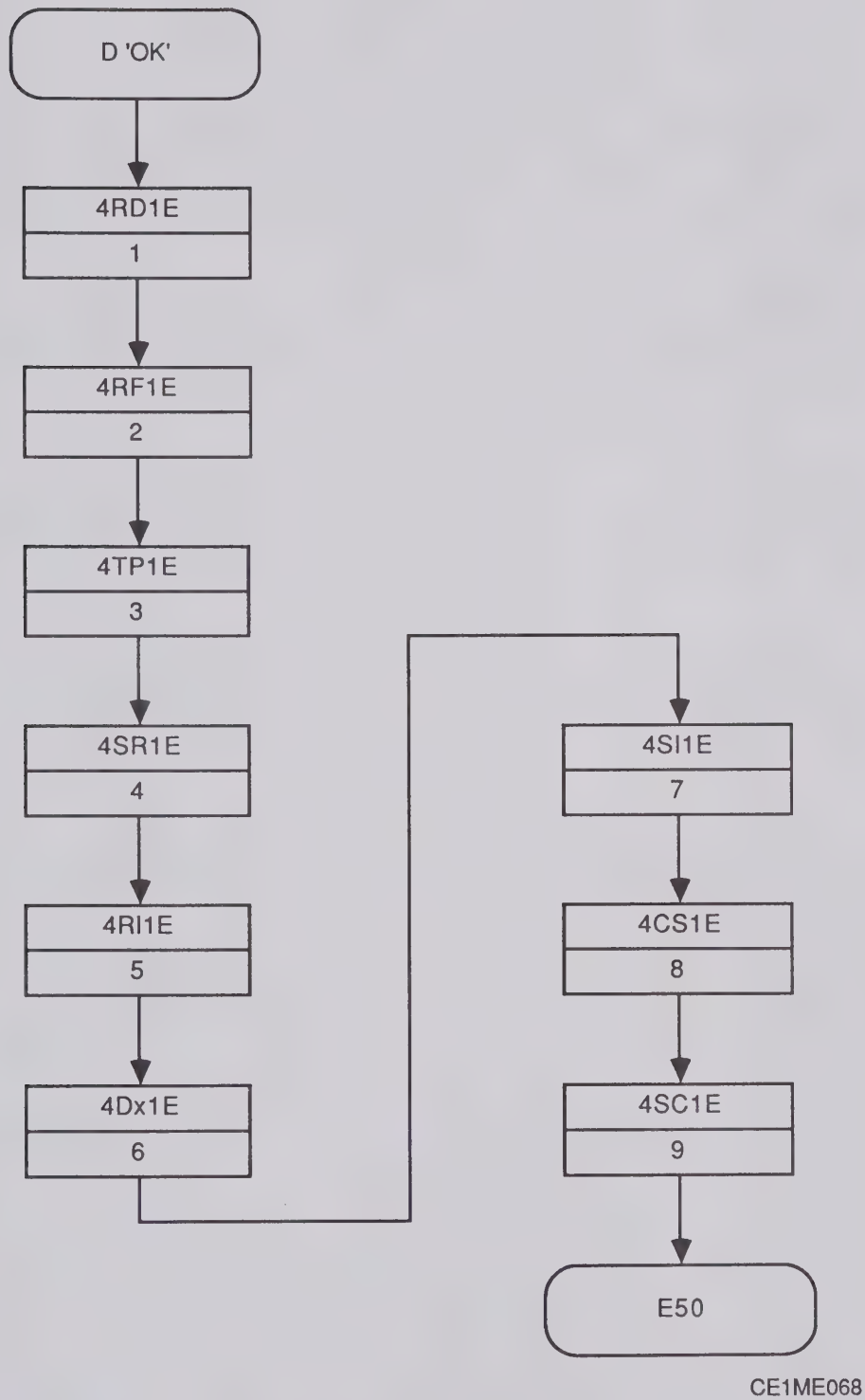
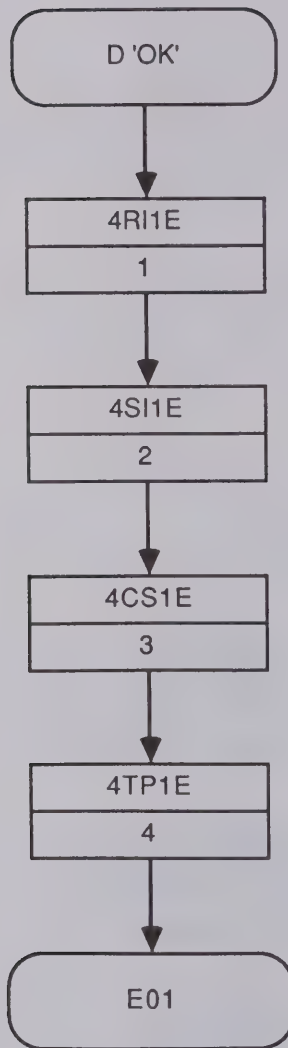
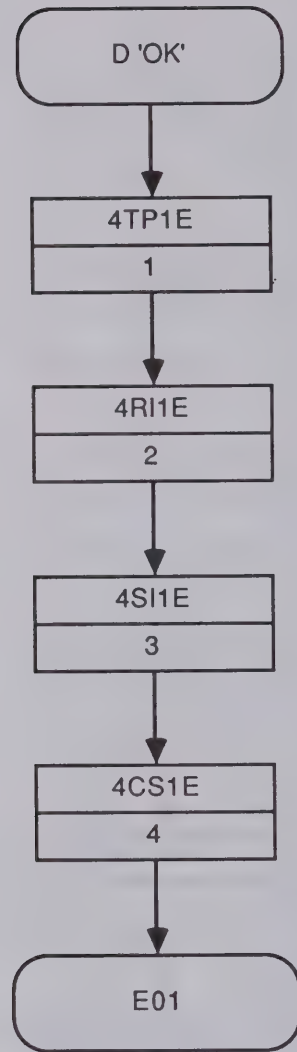


Figure 7-51. RAU E50 Fault



CE1ME069



CE1ME070

Figure 7-52. MSRT E01 Fault

Figure 7-53. RAU E01 Fault

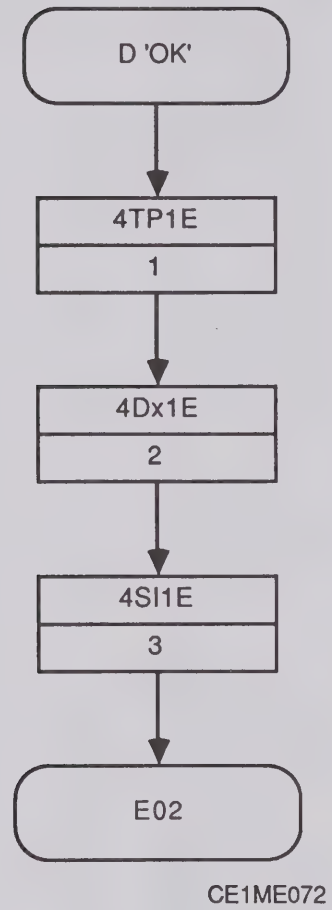
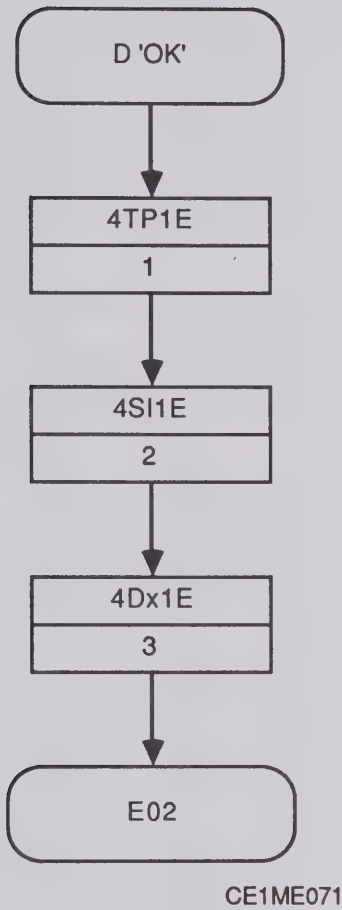


Figure 7-54. MSRT E02 Fault

Figure 7-55. RAU E02 Fault

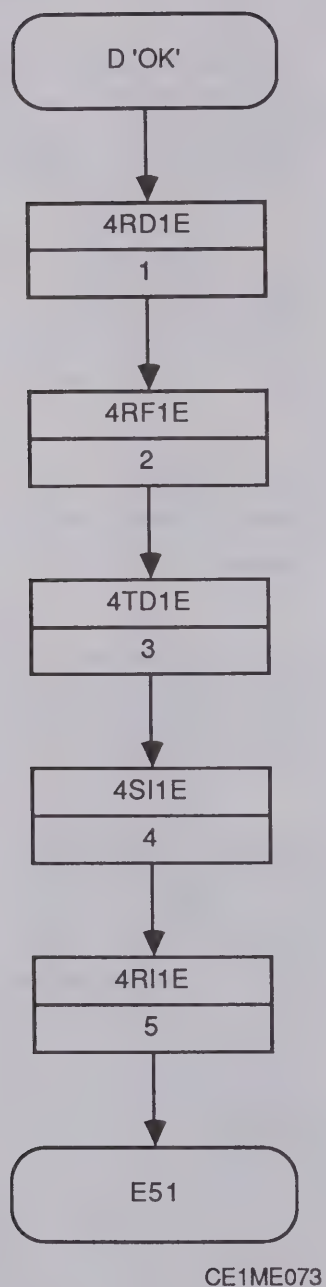


Figure 7-56. MSRT E51 Fault

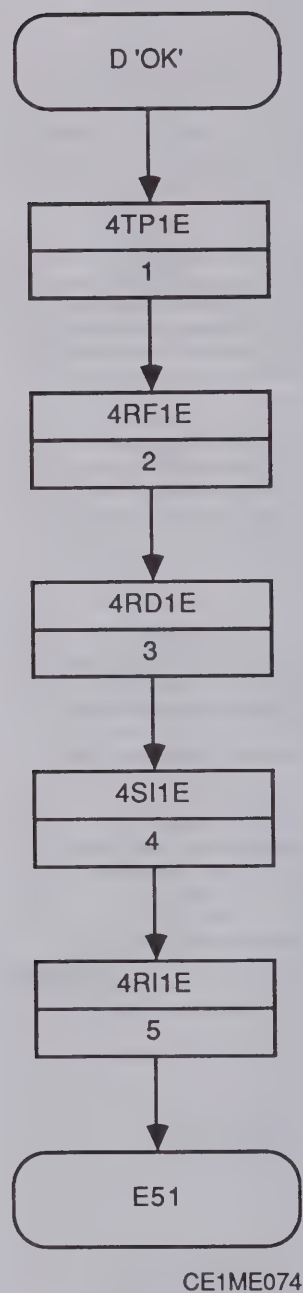
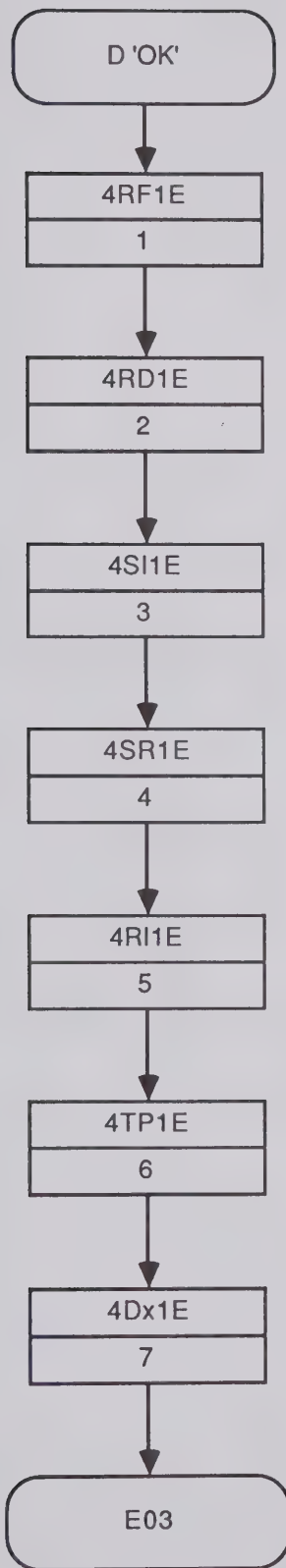
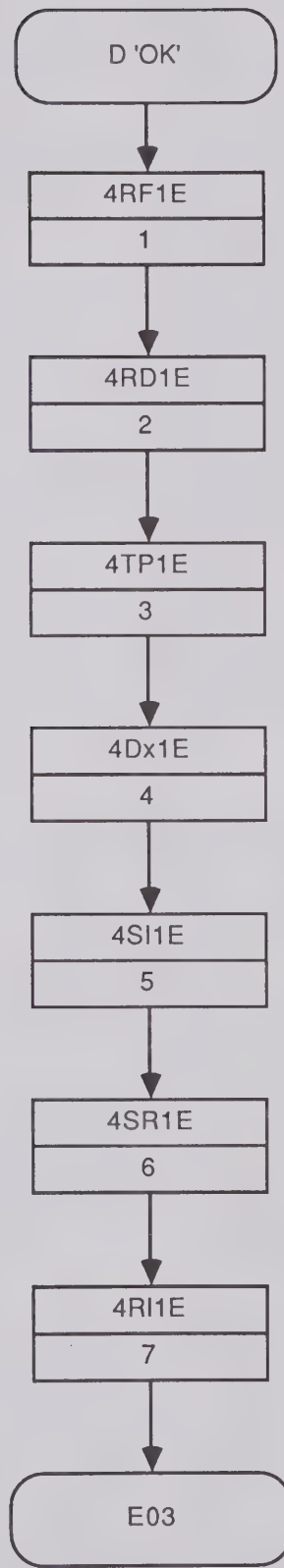


Figure 7-57. RAU E51 Fault



CE1ME075

Figure 7-58. MSRT E03 Fault



CE1ME076

Figure 7-59. RAU E03 Fault

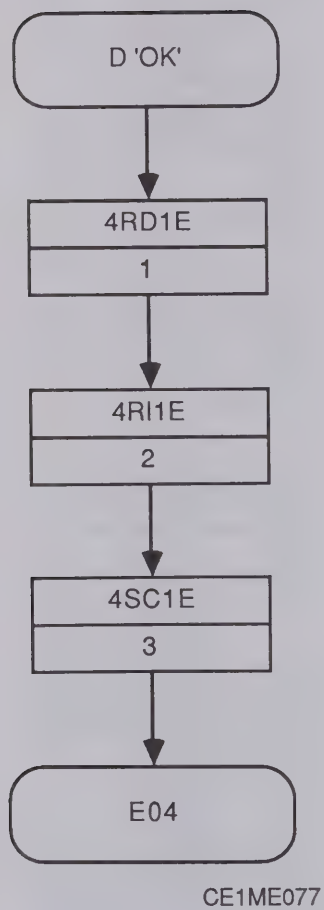


Figure 7-60. E04 Fault

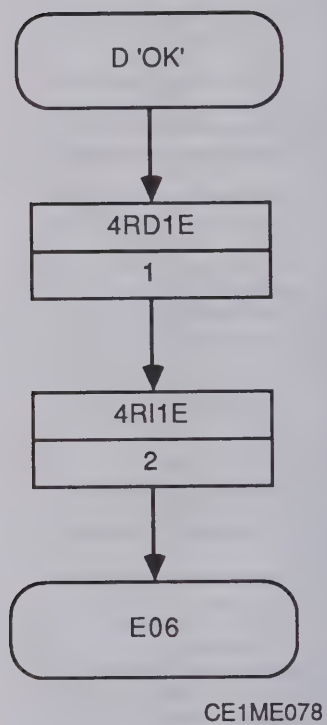


Figure 7-61. E06 Fault

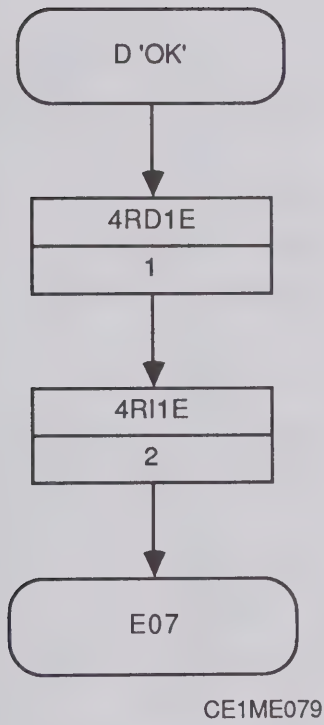


Figure 7-62. E07 Fault

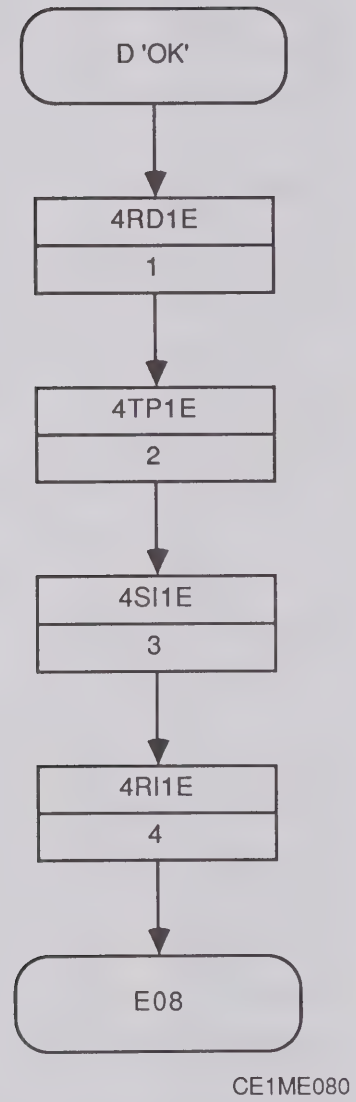
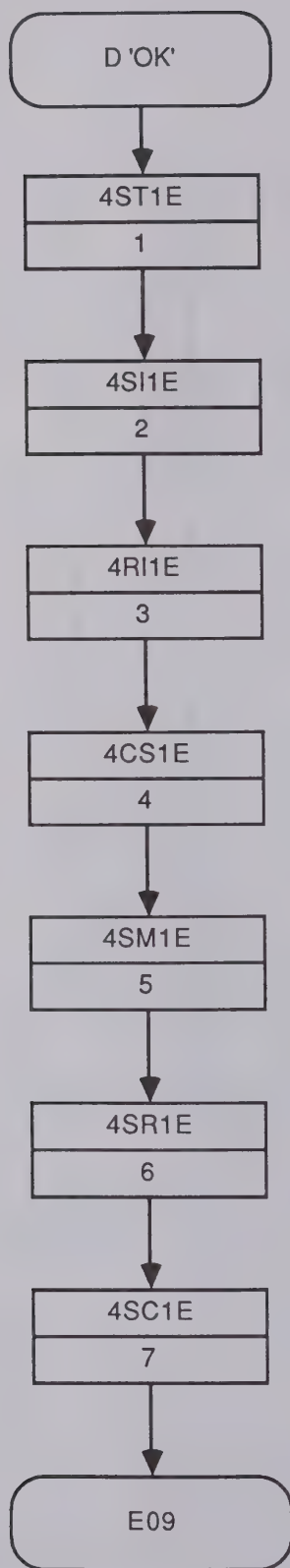
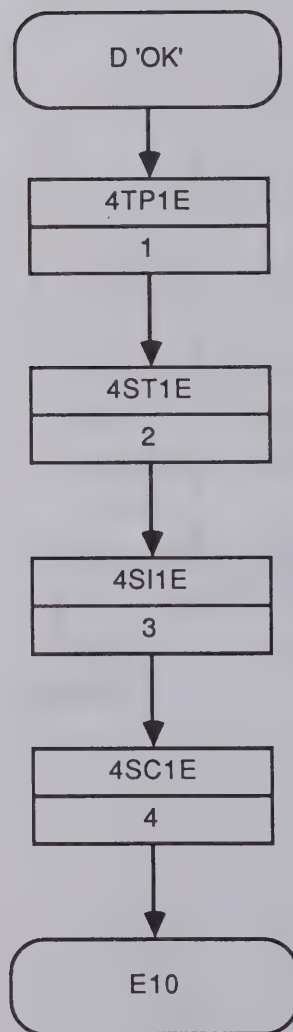


Figure 7-63. E08 Fault



CE1ME081

Figure 7-64. E09 Fault



CE1ME082

Figure 7-65. E10 Fault

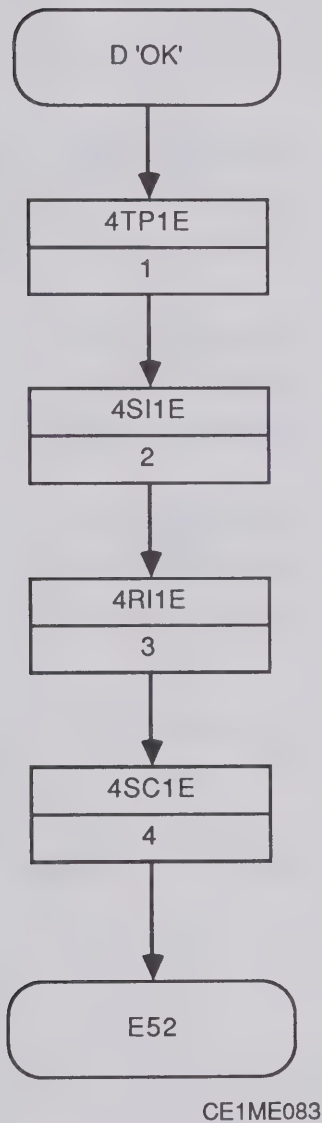


Figure 7-66. E52 Fault

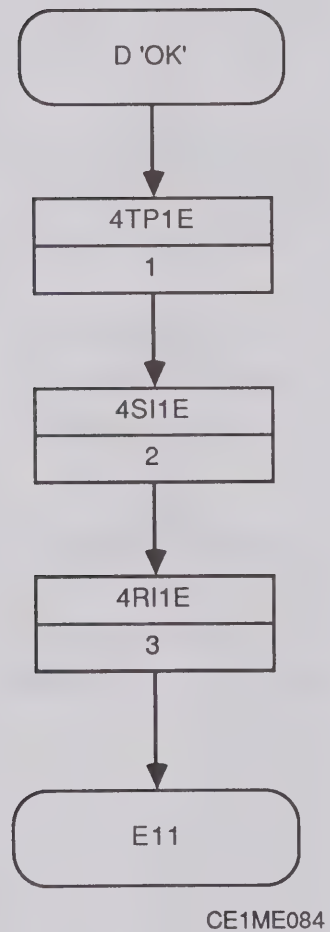


Figure 7-67. E11 Fault

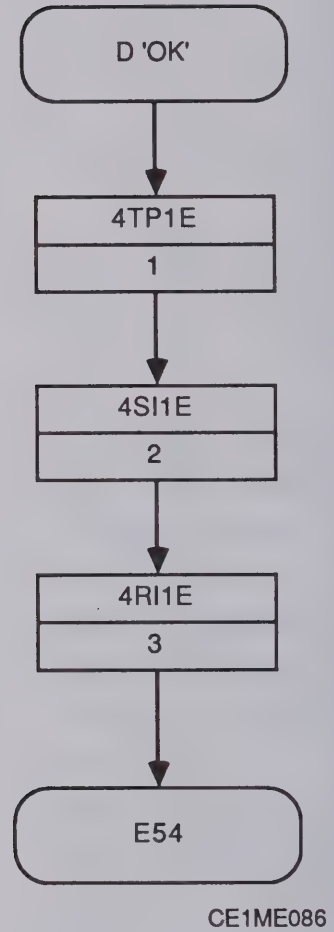
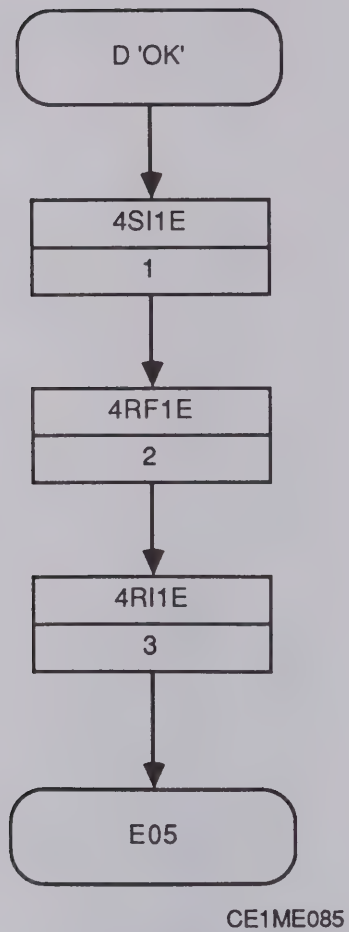


Figure 7-68. E05 Fault

Figure 7-69. MSRT E54 Fault

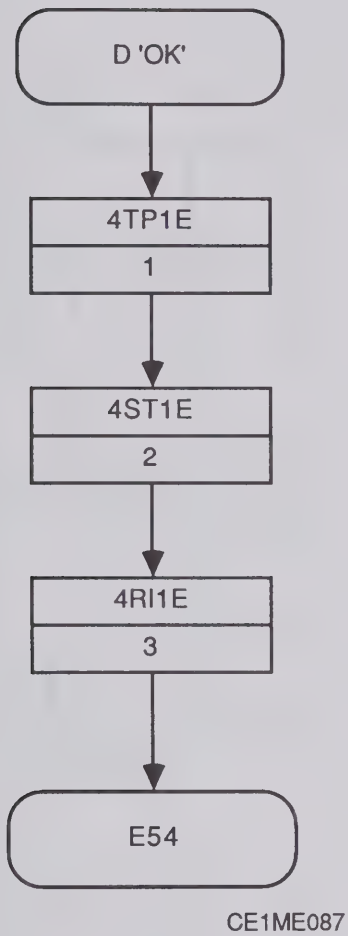


Figure 7-70. RAU E54 Fault

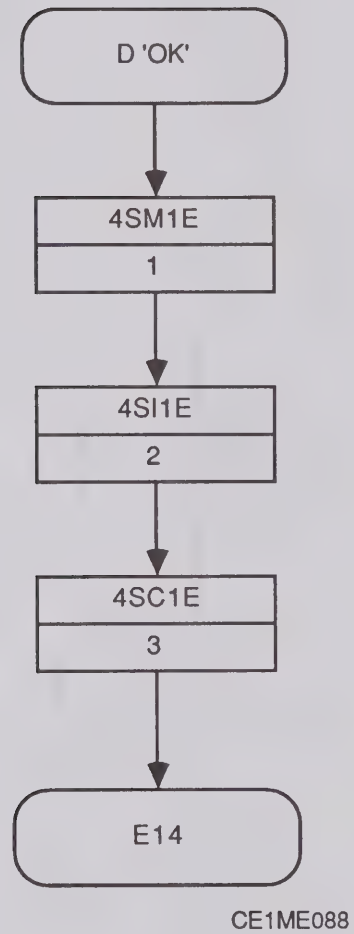


Figure 7-71. E14 Fault

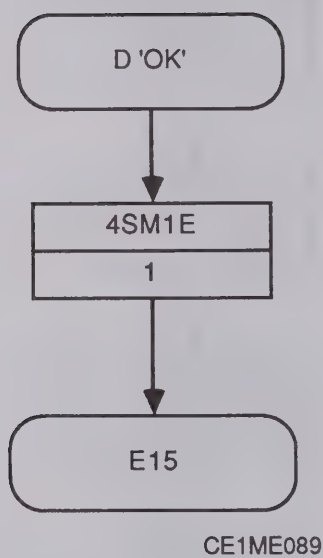


Figure 7-72. E15 Fault

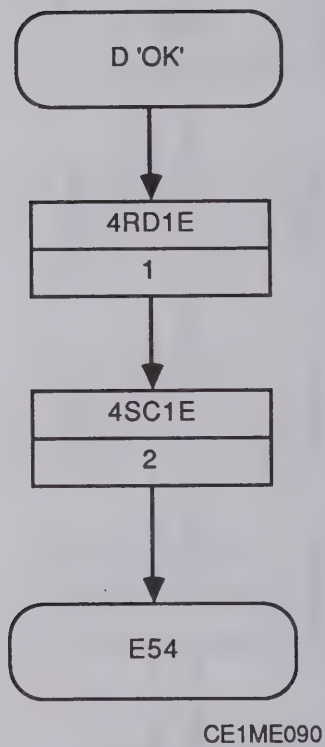


Figure 7-73. E54 Fault

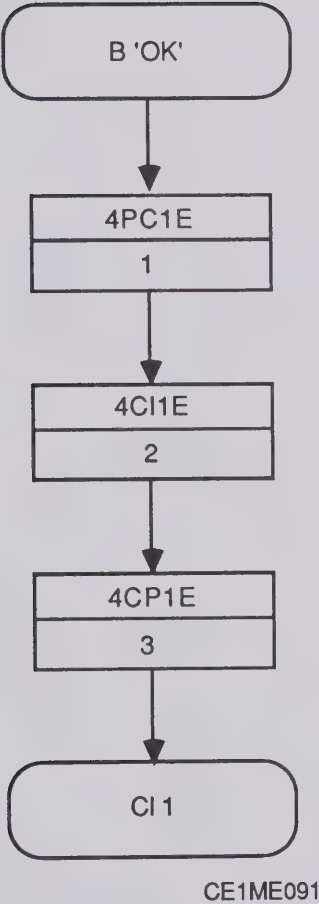


Figure 7-74. CI 1 Alarm

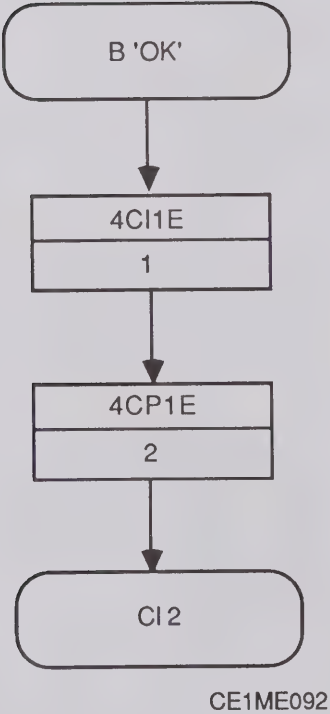


Figure 7-75. CI 2 Alarm

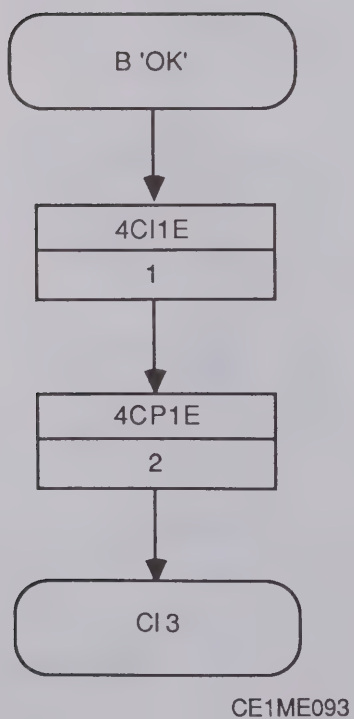


Figure 7-76. CI 3 Alarm

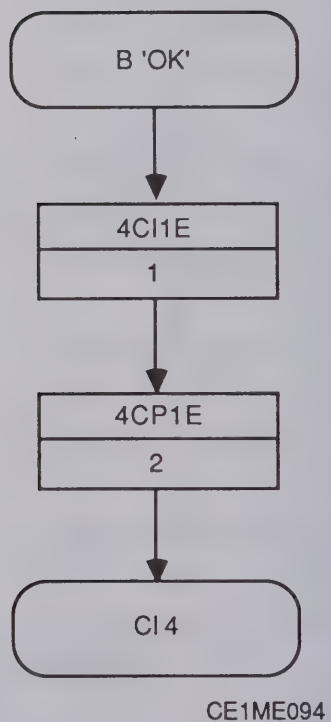


Figure 7-77. CI 4 Alarm

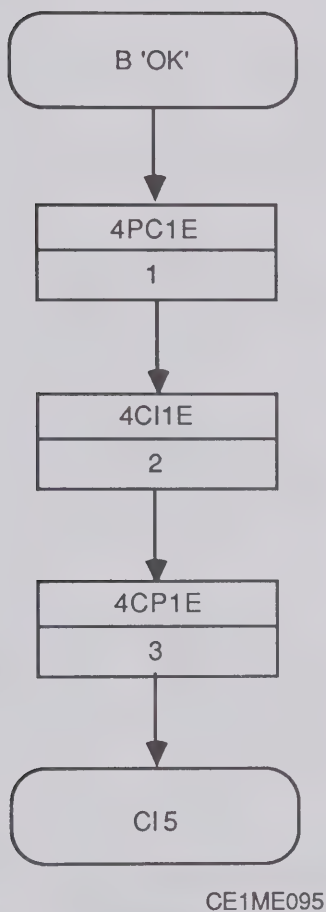


Figure 7-78. CI 5 Alarm

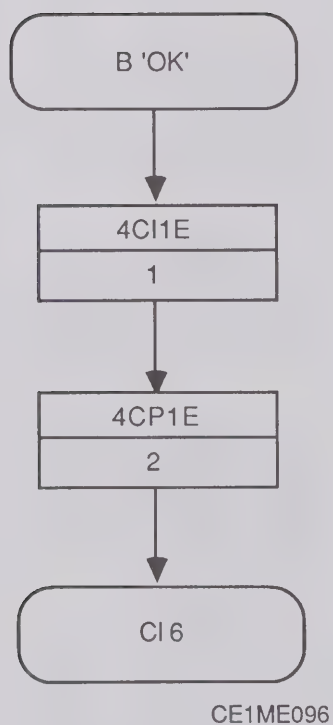


Figure 7-79. CI 6 Alarm

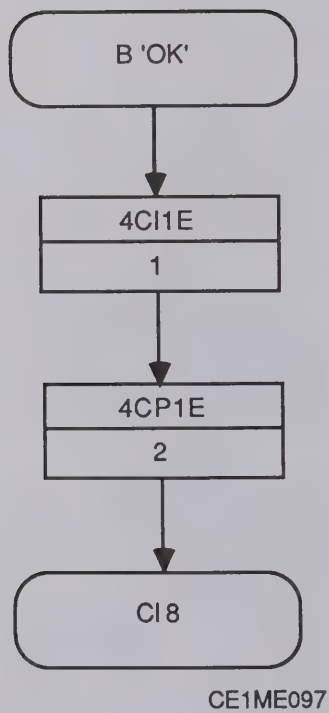


Figure 7-80. CI 8 Alarm

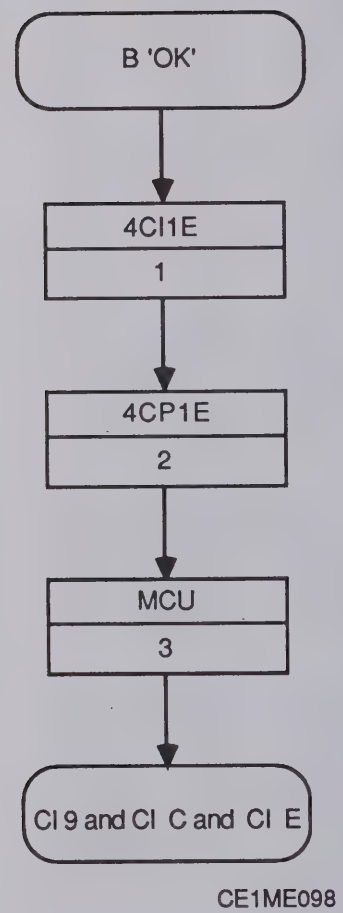


Figure 7-81. CI 9 Alarm and CI C Alarm and CI E Alarm

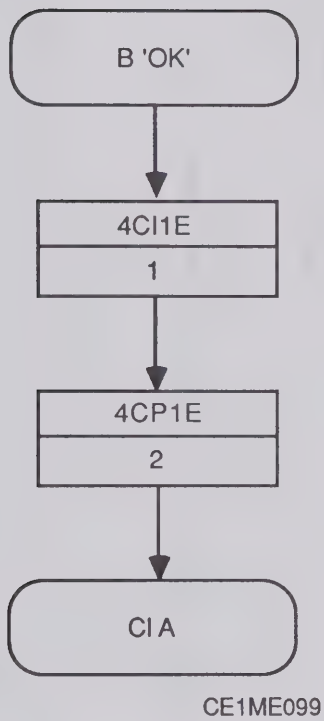


Figure 7-82. CI A Alarm

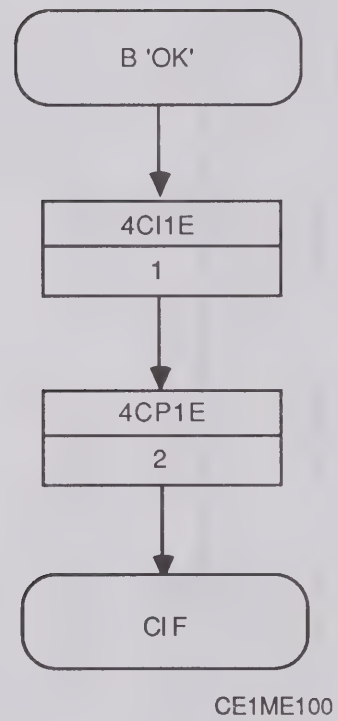


Figure 7-83. CI F Alarm

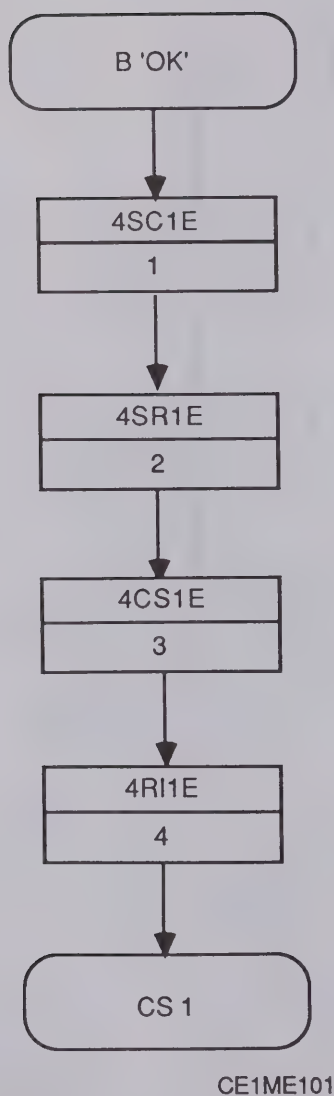


Figure 7-84. CS 1 Alarm

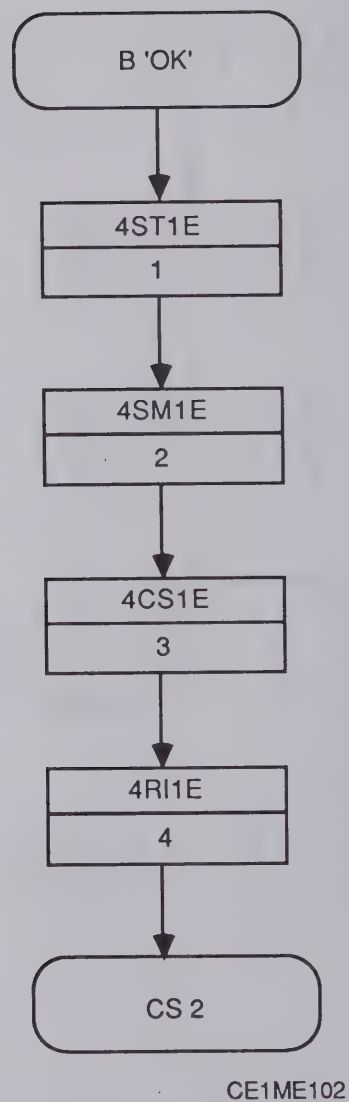


Figure 7-85. CS 2 Alarm

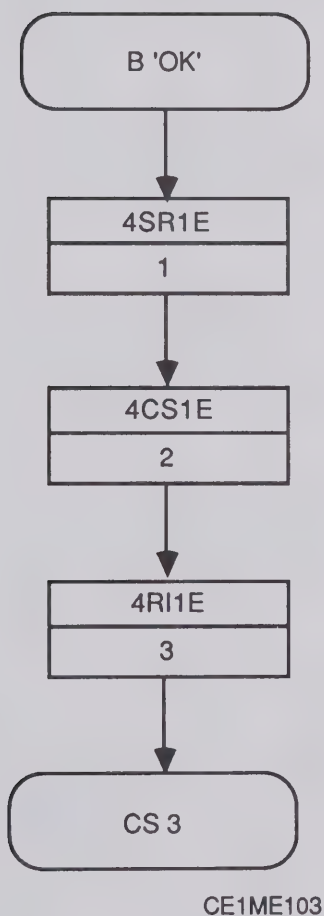


Figure 7-86. CS 3 Alarm

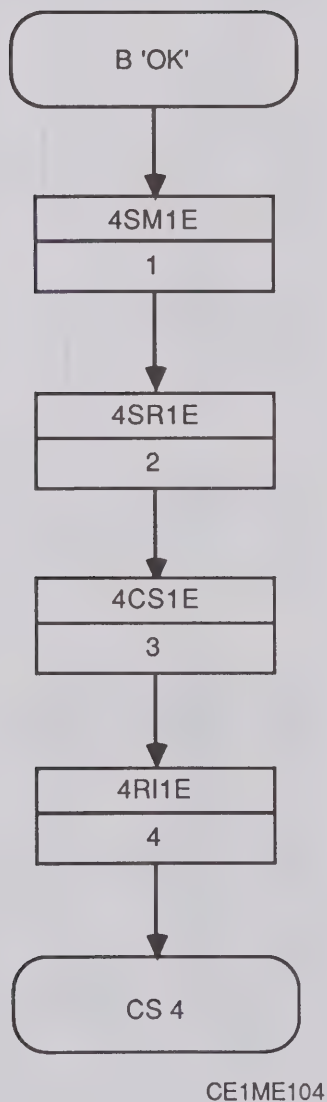


Figure 7-87. CS 4 Alarm

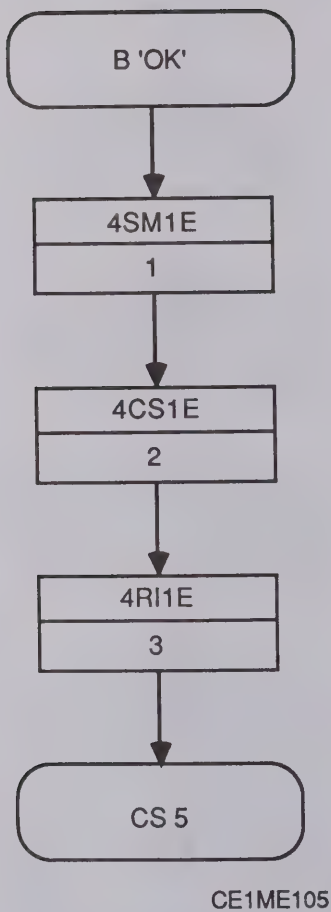


Figure 7-88. CS 5 Alarm

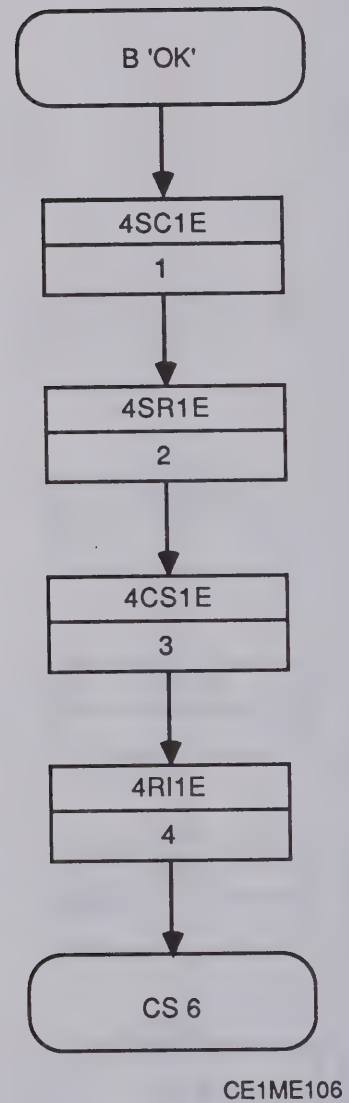


Figure 7-89. CS 6 Alarm

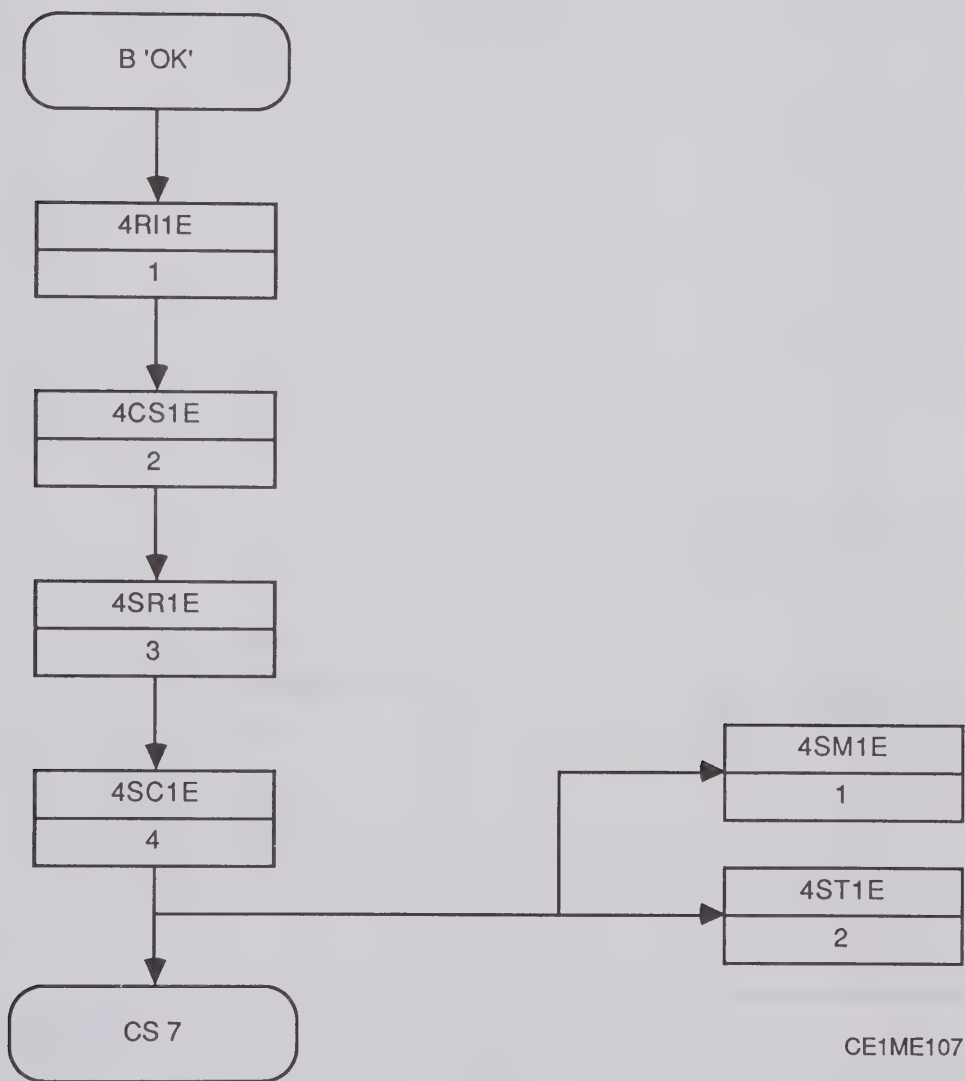
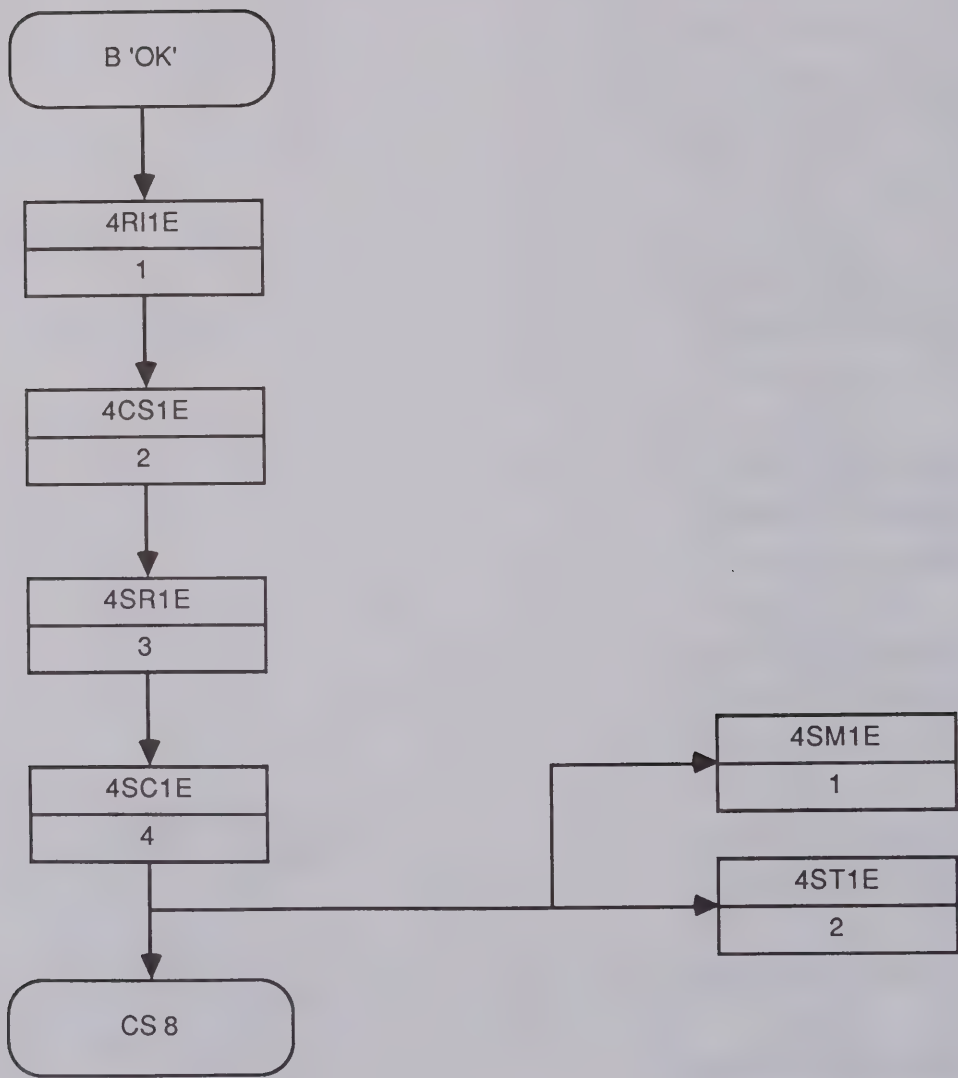
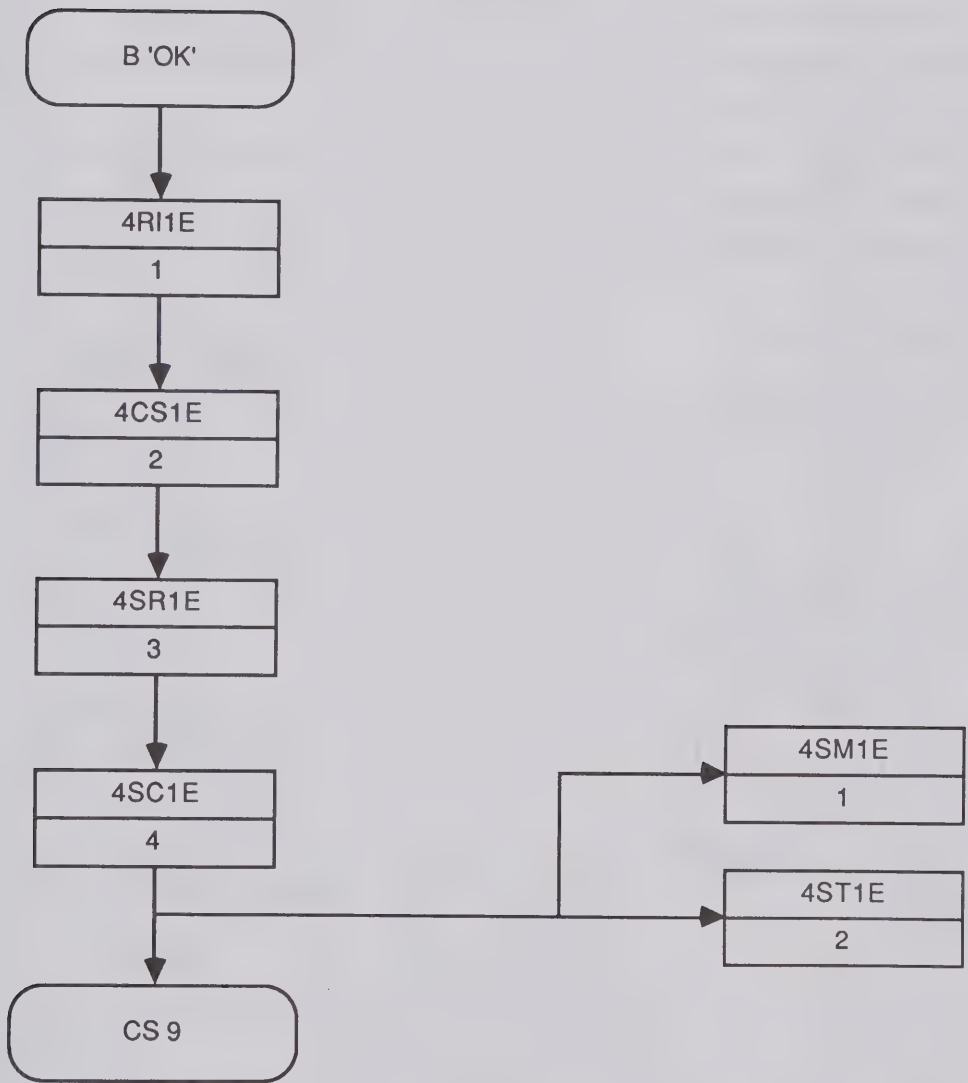


Figure 7-90. CS 7 Alarm



CE1ME108

Figure 7-91. CS 8 Alarm



CE1ME109

Figure 7-92. CS 9 Alarm

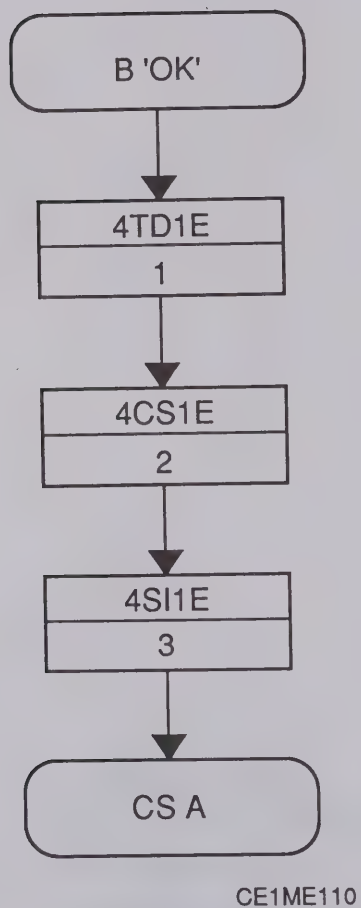


Figure 7-93. CS A Alarm

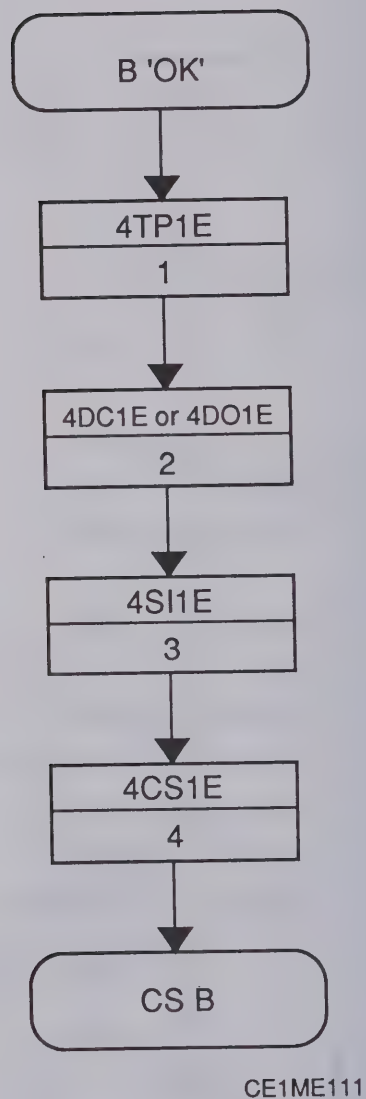


Figure 7-94. CS B Alarm

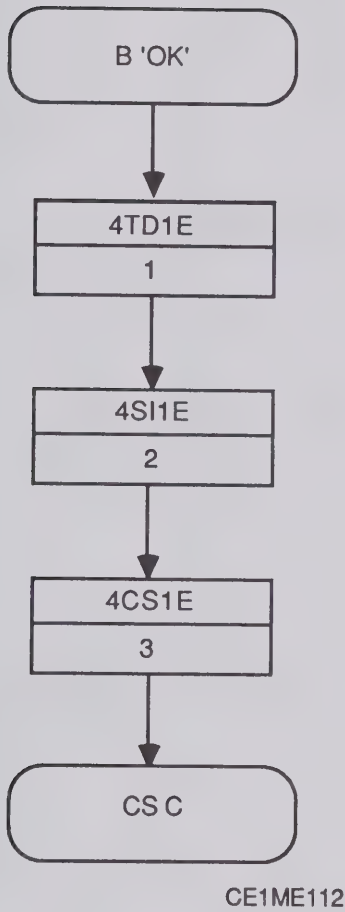


Figure 7-95. CS C Alarm

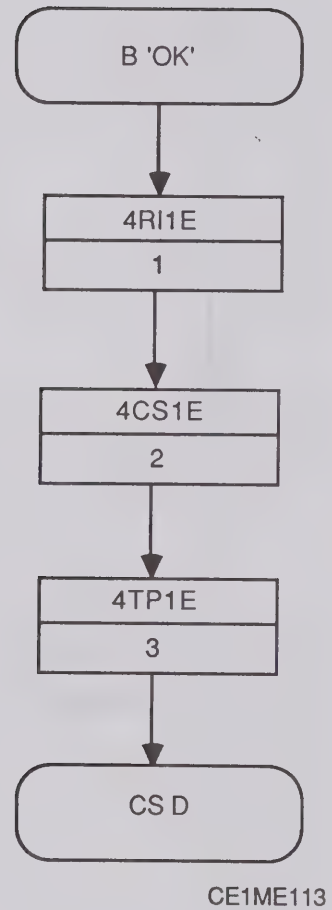


Figure 7-96. CS D Alarm

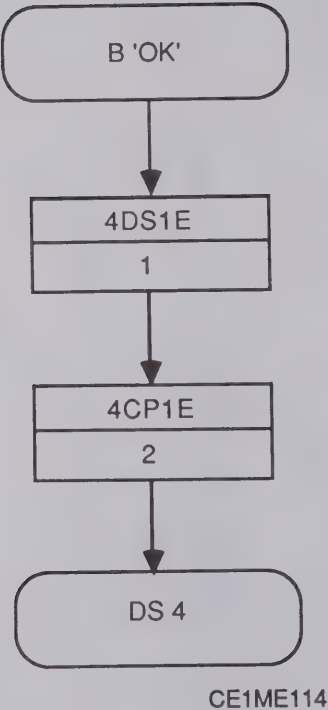


Figure 7-97. DS 4 Alarm

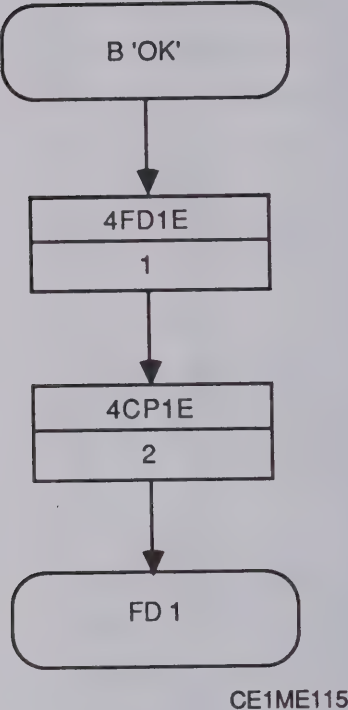


Figure 7-98. FD 1 Alarm

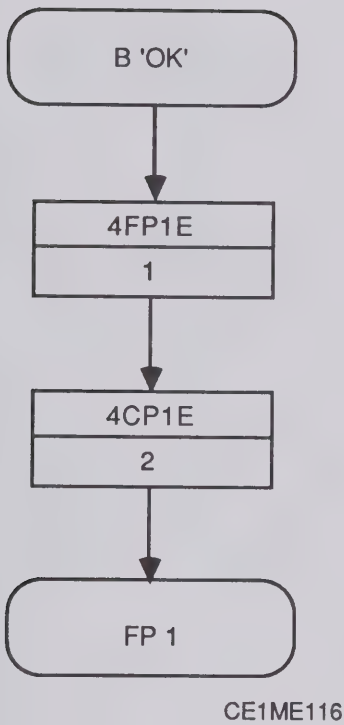


Figure 7-99. FP 1 Alarm

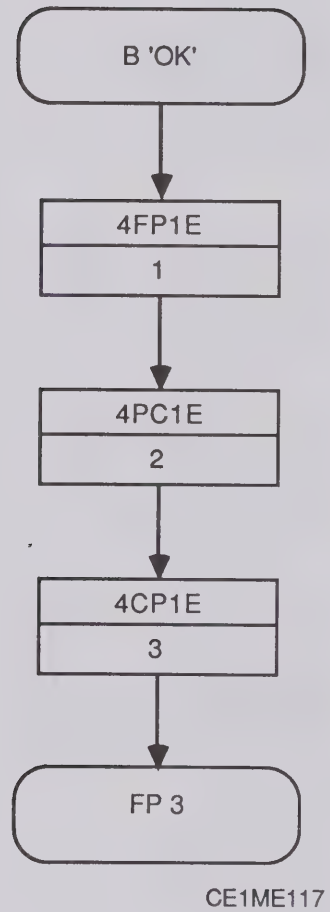


Figure 7-100. FP 3 Alarm

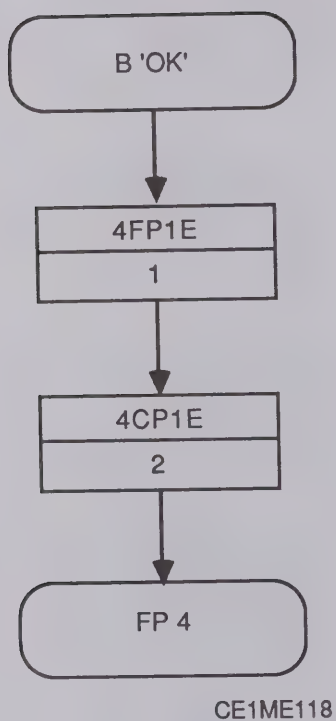


Figure 7-101. FP 4 Alarm

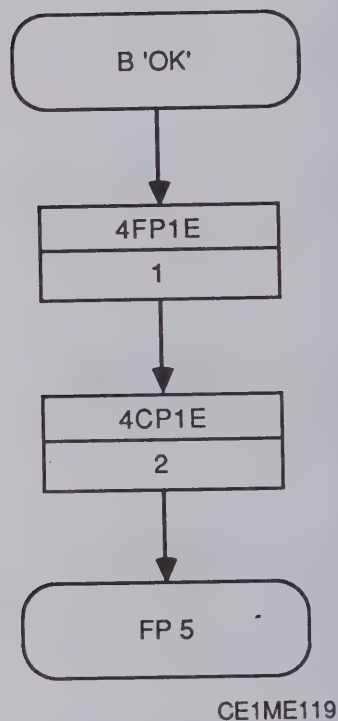


Figure 7-102. FP 5 Alarm

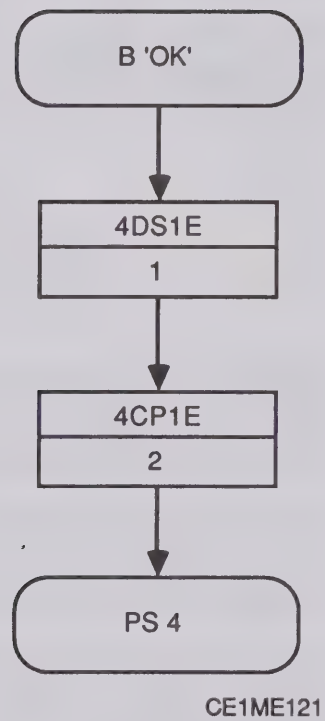
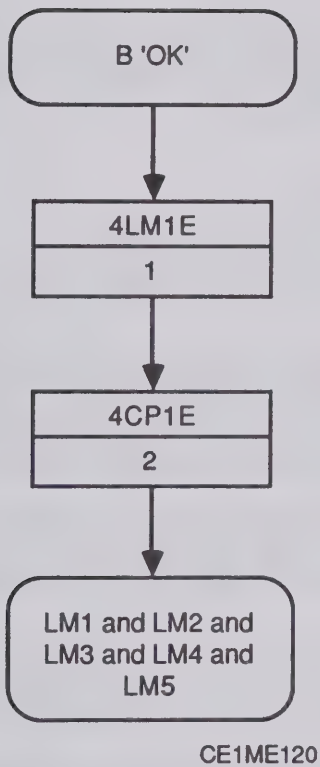


Figure 7-103. LM 1 Alarm and LM 2 Alarm and LM 3 Alarm and LM 4 Alarm and LM 5 Alarm

Figure 7-104. PS 4 Alarm

7-7.4.1 AUTOMATIC TEST OPERATIONS.

Perform the procedures in the following paragraphs only if the automatic version of the RT-1539 test software is being used.

7-7.4.1.1 Automatic Test Procedures. Use the following procedure to perform a test or series of tests on the RT-1539 using the test group.

- a. Enter R on the RT-1539 RUN/EXIT screen (fig. 7-104.1) to run the automatic test and the RT-1539 version screen (fig. 7-104.2) appears on the controller display.
- b. Type 1 and press ENTER for RT-1539 version number. Selection of diplexer mode is determined by whether 4DC1E (CONUS) or 4DO1E (OCONUS) CCA is present in RT-1539 under test. Type appropriate key for diplexer type and press ENTER. After pressing ENTER, the first of two RT-1539 preparation screens (fig. 7-104.3) appears on controller display.

NOTE

When the upper right corner of the screen indicates that there is more than one screen in the series of screens, the up cursor can be used to scroll back as far as the first screen in the series of screens.

- c. The first line of the screen is set to reverse video (highlighted). Perform the action described and press the down cursor key. The second line of the screen is set to reverse video. Continue in the same manner until the last line on the screen is set to reverse video. Press enter and the second of the two RT-1539 preparation screens (fig. 7-104.4) appears on the controller display.
- d. Perform the actions described on the screen and press the down cursor key as each action has been performed until the last line of the screen is set to reverse video. After the last action has been performed, press ENTER and the first of the two RT-1539 connections to ICD screens (fig. 7-104.5) is displayed on the controller display.
- e. Perform the actions described on the screen and press the down cursor key as each action has been performed until the last line of the screen is set to reverse video. After the last action has been performed, press ENTER and the second of the two RT-1539 connections to ICD screens (fig. 7-104.6) is displayed on the controller display .
- f. Perform the actions described on the screen and press the down cursor key as each action has been performed until the last line of the screen is set to reverse video. After the last action has been performed, press ENTER and the RT-1539 test options screen (fig. 7-104.7) is displayed on the controller display.
- g. Enter R to test the RT-1539 and continue to step h. Enter F to proceed to the sequence of final procedures and go to paragraph 7-7.1.2.
- h. After the R selection has been made and ENTER has been pressed, the RT-1539 test screen (fig. 7-104.8) appears on the controller display. This screen will not change, with the exception of the GROUP and SCENARIO data, until the test is halted by the operator (fig. 7-104.9) or a fault has been located by the software.
- i. Once the software has detected a fault, a fault locating screen (fig. 7-104.10) is displayed on the controller display while the software analyzes the fault.

RT-1539 REPAIR SESSION

TYPE "R" TO RUN

TYPE "E" TO EXIT

MAKE SELECTION AND PRESS ENTER : _

CE1ME128

Figure 7-104.1. RUN/EXIT Screen

RT-1539 VERSION

TYPE RT-1539 VERSION NUMBER AND PRESS ENTER : _

TYPE "R" FOR RAU MODE OR "M" FOR MSRT MODE AND PRESS ENTER :

TYPE "C" FOR CONUS MODE OR "O" FOR OCONUS MODE AND PRESS ENTER :

CE1ME129

I Figure 7-104.2. RT-1539 Version Screen

SCREEN 1 OF 2

RT-1539 PREPARATION

PRETEST PROCEDURES :

1. GROUND THE RT-1539 TO THE SHELTER TEST BENCH GROUND
2. SET THE RT-1539 ON/BLACKOUT/OFF SWITCH TO OFF
3. CHECK FUSES
4. CONNECT CABLE W030 TO RT-1539 J6
5. CONNECT CABLE W028 TO RT-1539 J4
6. SET THE RT-1539 NETWORK/RADIONET/STOR SWITCH TO NETWORK
7. SET THE RT-1539 RAU/MSRT/REMOTE SWITCH TO MSRT

↑ UP

↓ DOWN

CE1ME130

Figure 7-104.3. RT-1539 Preparation Screen 1 of 2

SCREEN 2 OF 2

RT-1539 PREPARATION

PRETEST PROCEDURES (CONTINUED) :

8. VERIFY THE ICD POWER SWITCH IS ON

9. SET THE RT-1539 ON/BLACKOUT/OFF SWITCH TO ON
10. CONNECT THE KYK13 TO RT-1539 J3
11. ACTIVATE ZERO/FILL SWITCH TO FILL FOUR TIMES
12. DISCONNECT THE KYK13 FROM THE RT-1539
13. SET THE RT-1539 ON/BLACKOUT/OFF SWITCH TO OFF
14. SET THE RT-1539 RAU/MSRT/REMOTE SWITCH TO REMOTE

↑ UP

↓ DOWN

CE1ME131

Figure 7-104.4. RT-1539 Preparation Screen 2 of 2

SCREEN 1 OF 2

RT-1539 CONNECTIONS TO ICD

1. DISCONNECT CABLE W030 FROM THE RT-1539

2. REMOVE THE TOP COVER OF THE RT-1539

3. CHECK CABLE CONNECTIONS :

CABLES W032 AND W033 FROM THE PROBE TO ICD

4. DISCONNECT THE PROBE FROM ITS PROTECTIVE ENCLOSURE

↑ UP

↓ DOWN

CE1ME132

Figure 7-104.5. RT-1539 Connections to ICD Screen 1 of 2

SCREEN 2 OF 2

RT-1539 CONNECTIONS TO ICD

5. CONNECT :

THE PROBE TO RT-1539 J30
P3 FROM THE PROBE TO 4SC1E J2
CABLE W026 TO RT-1539 J1
CABLE W027 TO RT-1539 J2
CABLE W029 TO RT-1539 J5
CABLE W031 TO RT-1539 J7

6. PUT THE TEST COVER IN PLACE

7. CONNECT CABLE W030 TO RT-1539 J6

↑ UP

↓ DOWN

CE1ME133

I Figure 7-104.6. RT-1539 Connections to ICD Screen 2 of 2

RT-1539 TEST OPTIONS

TYPE "R" TO RUN

TYPE "F" TO PROCEED TO FINAL PROCEDURES

MAKE SELECTION AND PRESS ENTER : _

CE1ME134

RT-1539 TEST	
TEST IN PROGRESS	
GROUP :	
SCENARIO :	
TEST SESSION CAN BE STOPPED BY PRESSING "CTRL" AND "A" SIMULTANEOUSLY	

CE1ME135

Figure 7-104.8. Test In Progress Screen

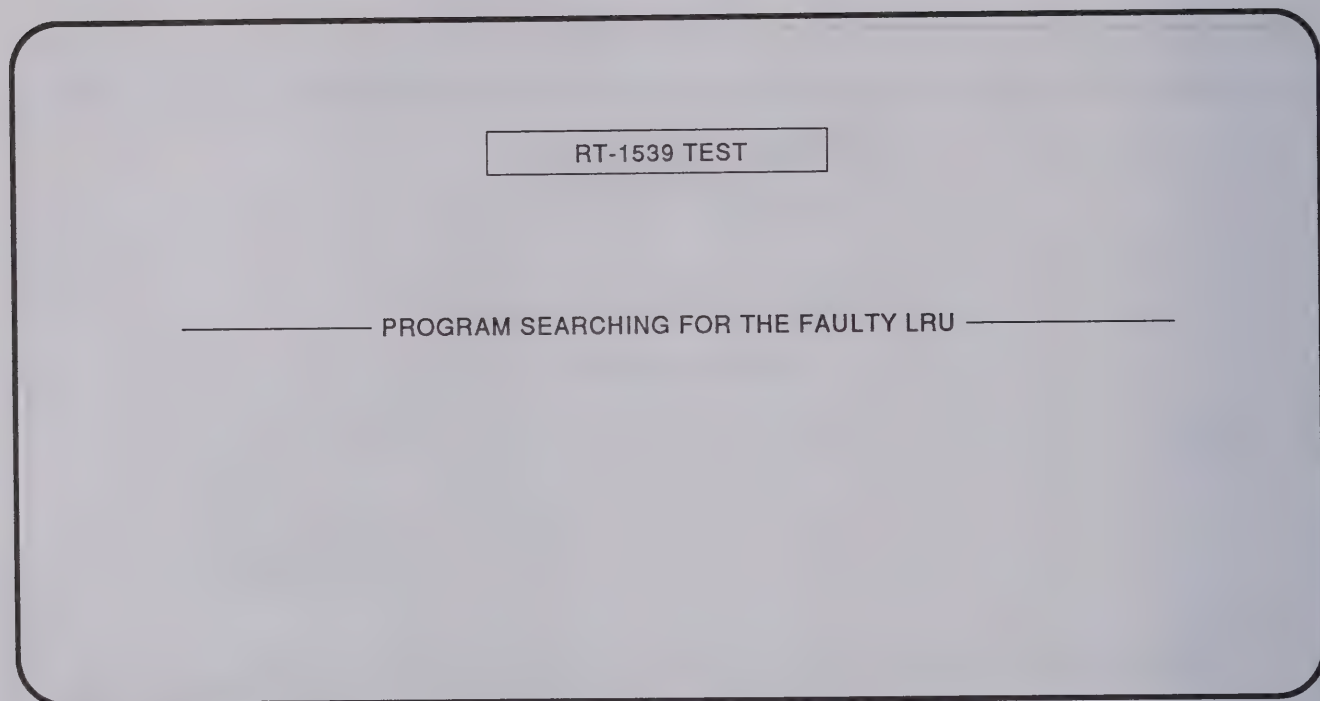
RT-1539 TEST RESULTS

TEST SESSION STOPPED BY OPERATOR

PRESS ENTER TO ACCESS TEST OPTIONS

CE1ME136

Figure 7-104.9. Test Halted by Operator Screen



CE1ME137

I Figure 7-104.10. Searching for Faulty LRU Screen

- j. Upon completing analysis of the fault one of several screen (fig. 7-104.11 through fig. 7-104.20) is displayed on the controller display. Follow the instructions on the screens and scroll down through the information displayed there and press ENTER to continue to the next screen or test as applicable to the situation. If any faults have been detected and the fault has been found, the RT-1539 test results fault isolated screen (fig. 7-104.21) appears on the controller display. If the fault could not be located, the RT-1539 test results unable to isolate screen (fig. 7-104.22) appears on the controller display.

7-7.4.1.2 Functional Test Procedures. Perform the following steps when running the functional test portion of the automated software.

- a. From the RT-1539 repair session screen (fig. 7-104.23) enter F. The functional tests screen (fig. 7-104.24) appears on the controller display.
- b. The first action to be performed is highlighted in reverse video. Perform the actions described there and press the down cursor one time. The second action to be performed is then displayed in reverse video. After performing each action in reverse video press the down cursor until the last action has been performed, then press ENTER. The functional test 1.1 screen (fig. 7-104.25) is displayed on the controller display.
- c. For the remainder of the functional test screens (fig. 7-104.26 through 7-104.60) perform the actions described on each screen by using the cursor control keys. Some screens, such as functional test 1.2 look only for a response to a question. Enter the response in the same manner as the one shown and press enter.
- d. If a fault is indicated, the software displays the searching for faulty LRU screen (fig. 7-104.10) appears on the controller display. Upon completing analysis of the fault one of several screens (fig. 7-104.11 through fig. 7-104.20) is displayed on the controller display. Follow the instructions on the screens and scroll down through the information displayed there and press ENTER to continue to the next screen or test as applicable to the situation.
- e. Successful completion of the test is indicated by the test results screen (fig. 7-104.61) and the controller once again displays the RT-1539 repair session screen (fig. 7-104.23). If no further testing is to be performed on the UUT, enter F and go to paragraph 7-7.1.3.

7-7.4.1.3 Final Procedures. After selecting the F option from the RT-1539 repair session screen (fig. 7-104.23) the final procedures screen (fig. 7-104.62) of the RT-1539 repair session appears on the controller display. Use the cursor down key to scroll down as each action is performed. When the last item is in reverse video and ENTER is pressed, the RUN/EXIT screen (fig. 7-104.1) appears on the controller display. If no further units are to be tested, enter E and the MS-DOS screen (fig. 7-104.63) appears on the controller display. Otherwise testing continues as described beginning at paragraph 7-7.1.1.

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539

2. UNSEAT UNIT : _____

↑ UP

↓ DOWN

CE1ME138

I Figure 7-104.11. Unseat Multiple CCAs Screen One, Initial View

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539

2. UNSEAT UNIT _____

↑ UP

PRESS ENTER TO CONTINUE

CE1ME139

Figure 7-104.12. Unseat Multiple CCAs Screen One, After Pressing Cursor Down Key

HANDLING

1. REMOVE THE TEST COVER

2. REMOVE UNIT _____

PRESS ENTER TO CONTINUE

CE1ME140

Figure 7-104.13. Unseat Multiple CCAs Screen Two

HANDLING

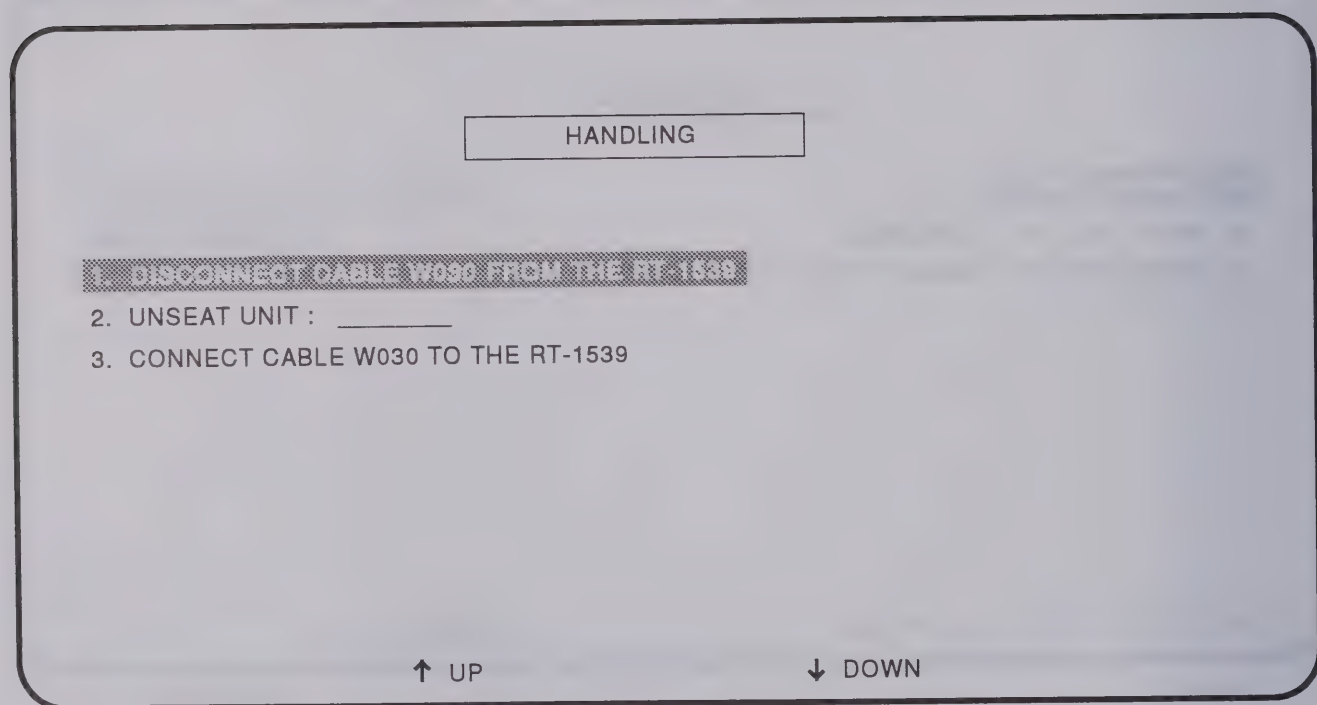
1. UNSEAT UNIT : _____
2. REINSTALL THE TEST COVER
3. CONNECT CABLE W030 TO THE RT-1539

↑ UP

↓ DOWN

CE1ME141

Figure 7-104.14. Unseat Multiple CCAs Screen Three



CE1ME142

Figure 7-104.15. Unseat Single CCA Screen

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539

2. REMOVE THE TEST COVER

3. RESEAT UNIT : _____

4. REINSTALL THE TEST COVER

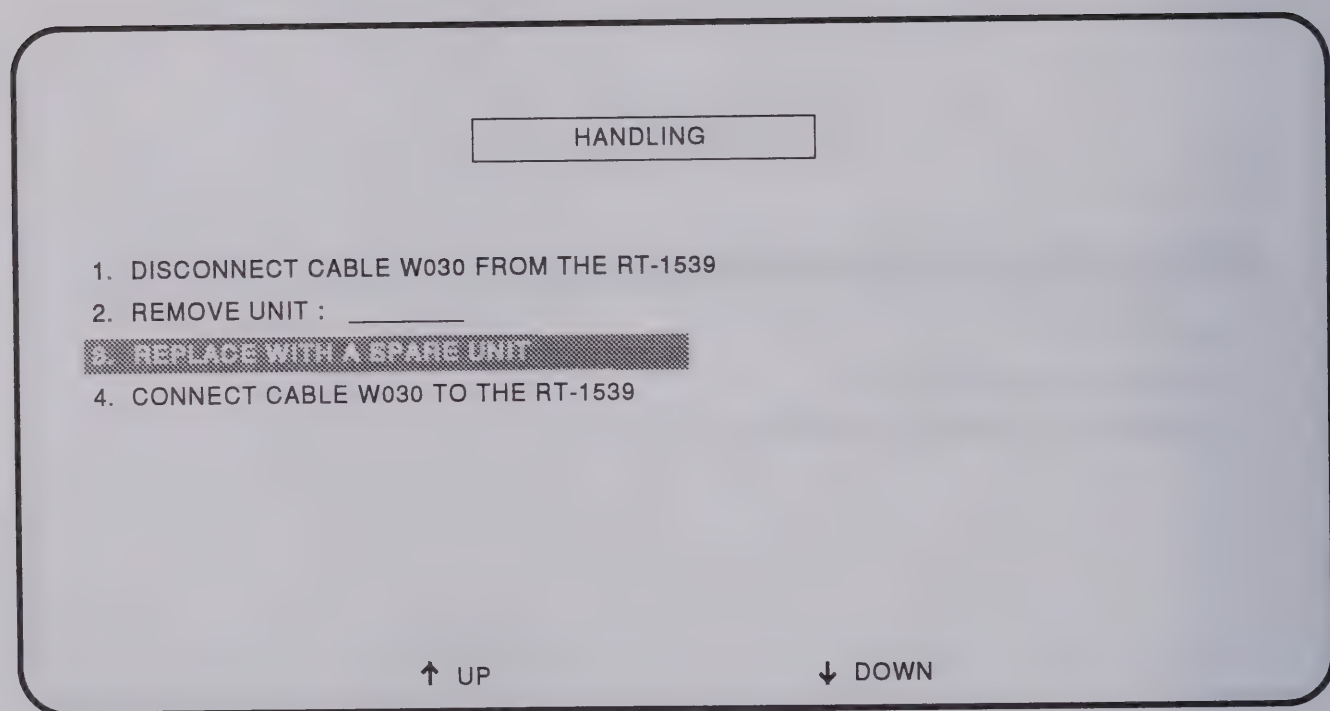
5. CONNECT CABLE W030 TO THE RT-1539

↑ UP

↓ DOWN

CE1ME143

Figure 7-104.16. Reseat CCA(s) Screen



CE1ME144

■ Figure 7-104.17. Remove and Replace CCA Screen

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539
2. REMOVE THE TEST COVER
3. REMOVE UNIT : _____
- 4. REPLACE WITH A SPARE UNIT**
5. REINSTALL THE TEST COVER BACK IN PLACE
6. CONNECT CABLE W030 TO THE RT-1539

↑ UP

↓ DOWN

CE1ME145

Figure 7-104.18. Remove and Replace CCA From RF Section Screen

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539

2. REMOVE SPARE UNIT : _____

3. REINSTALL ORIGINAL UNIT

4. CONNECT CABLE W030 TO THE RT-1539

↑ UP

↓ DOWN

CE1ME146

I Figure 7-104.19. Reinstall CCA Previously Removed Screen

HANDLING

1. DISCONNECT CABLE W030 FROM THE RT-1539
- 2. REMOVE THE TEST COVER**
3. REMOVE SPARE UNIT
4. REINSTALL ORIGINAL UNIT
5. REINSTALL THE COVER BACK IN PLACE
6. CONNECT CABLE W030 TO THE RT-1539

↑ UP

↓ DOWN

CE1ME147

Figure 7-104.20. Reinstall CCA Previously Removed From RF Section Screen

RT-1539 TEST RESULTS

TEST COMPLETED
UNIT(S) REPLACED :

PRESS ENTER TO CONTINUE TEST

CE1ME148

I Figure 7-104.21. Fault Isolated Screen

RT-1539 TEST RESULTS

THE SET HAS TO BE REPAIRED AT IGS LEVEL
REMOVE SPARE UNIT(S)
REINSTALL ORIGINAL UNIT(S)

PRESS ENTER TO ACCESS TEST OPTIONS

CE1ME149

RT-1539 REPAIR SESSION

TYPE "R" TO RUN FUNCTIONAL TEST

TYPE "F" TO PROCEED TO FINAL PROCEDURES

MAKE SELECTION AND PRESS ENTER : _

CE1ME150

Figure 7-104.23. RT-1539 Repair Session Screen

FUNCTIONAL TESTS SESSION

PRETEST PROCEDURES :

1. **DISCONNECT CABLE W030 FROM RT-1539 J6**
2. DISCONNECT CABLE W029 FROM RT-1539 J5
3. CONNECT A DNVT TO RT-1539 J5
4. SET THE RT-1539 RAU/MSRT/REMOTE SWITCH TO RAU
5. DISCONNECT CABLE W028 FROM RT-1539 J4
6. CONNECT CABLE W030 TO RT-1539 J6

↑ UP

↓ DOWN

CE1ME151

I Figure 7-104.24. Functional Tests Session Screen

FUNCTIONAL TEST 1.1

RT-1539 PREPARATION

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT RAU
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT OFF

↑ UP

↓ DOWN

CE1ME152

Figure 7-104.25. Functional Test 1.1 Screen

FUNCTIONAL TEST 1.2

RESULT:

1. ARE ALL LIGHTS OFF? (Y/N) : _

PRESS ENTER TO CONTINUE

CE1ME153

I Figure 7-104.26. Functional Test 1.2 Screen

FUNCTIONAL TEST 2.1

RT-1539 PREPARATION

- 1. SET THE RAU/MSRT/REMOTE SWITCH TO MSRT**
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT OFF

↑ UP

↓ DOWN

CE1ME154

Figure 7-104.27. Functional Test 2.1 Screen

FUNCTIONAL TEST 2.2

RESULT:

1. ARE ALL LIGHTS OFF? (Y/N) : _

PRESS ENTER TO CONTINUE

CE1ME155

FUNCTIONAL TEST 3.1

RT-1539 PREPARATION

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT OFF

↑ UP

↓ DOWN

CE1ME156

Figure 7-104.29. Functional Test 3.1 Screen

FUNCTIONAL TEST 3.2

REQUIRED ACTION:

1. MOMENTARILY PRESS BATT. TEST PUSH BUTTON WHILE OBSERVING

BATT. OK LIGHT

RESULT:

1. WAS THE BATT. OK LIGHT ON WHEN BATT. TEST PUSH BUTTON WAS PRESSED AND OFF WHEN RELEASED? (Y/N) : _

↑ UP

↓ DOWN

CE1ME157

I Figure 7-104.30. Functional Test 3.2 Screen

FUNCTIONAL TEST 4.1

RT-1539 PREPARATION

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME158

Figure 7-104.31. Functional Test 4.1 Screen

FUNCTIONAL TEST 4.2

RESULT:

1. ARE ALL LIGHTS OFF? (Y/N):

↑ UP

↓ DOWN

CE1ME159

Figure 7-104.32. Functional Test 4.2 Screen

FUNCTIONAL TEST 5.1

RT-1539 PREPARATION:

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT ON

↑ UP

↓ DOWN

CE1ME160

I Figure 7-104.33. Functional Test 5.1 Screen

FUNCTIONAL TEST 5.2

REQUIRED ACTION:

1. MOMENTARILY PRESS BATT. TEST PUSH BUTTON

WHILE OBSERVING ALL LIGHTS

RESULTS:

1. WERE ALL LIGHTS ON WHEN BATT. TEST PUSH BUTTON
WAS PRESSED
AND OFF WHEN RELEASED ? (Y/N):

↑ UP

↓ DOWN

CE1ME161

FUNCTIONAL TEST 6.1

RT-1539 PREPARATION:

- 1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT**
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. SET THE OFF/BLACKOUT/ON SWITCH TO BLACKOUT

↑ UP

↓ DOWN

CE1ME162

I Figure 7-104.35. Functional Test 6.1 Screen

FUNCTIONAL TEST 6.1

REQUIRED ACTION:

1. MOMENTARILY PRESS BATT. TEST PUSH BUTTON WHILE OBSERVING ALL LIGHTS

RESULTS:

1. DID ALL LIGHTS REMAIN OFF? (Y/N):

↑ UP

↓ DOWN

CE1ME163

FUNCTIONAL TEST 7.1

RT-1539 PREPARATION:

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME164

Figure 7-104.37. Functional Test 7.1 Screen

FUNCTIONAL TEST 7.2

REQUIRED ACTIONS:

1. GO OFF-HOOK WITH THE DNV
2. DIAL 8F 03 0010 0420 R
3. GO ON-HOOK WITH THE DNV

RESULT:

1. IS THE LOADED FREQ. PLAN LIGTH ON? (Y/N) :

↑ UP

↓ DOWN

CE1ME165

FUNCTIONAL TEST 8.1

RT-1539 PREPARATION:

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT

2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK

3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT ON

↑ UP

↓ DOWN

CE1ME166

I Figure 7-104.39. Functional Test 8.1 Screen

FUNCTIONAL TEST 8.2

REQUIRED ACTIONS:

1. GO OFF HOOK WITH THE DNV

2. DIAL 8R 123 1234567
3. GO ON-HOOK WITH THE DNV

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):
 - LOADED DIRECTORY NO. LIGHT IS LIT ON
 - LOADED FREQ. PLAN LIGHT IS LIT ON OR FLASHING
 - SCANNING LIGHT IS FLASHING

↑ UP

↓ DOWN

CE1ME167

Figure 7-104.40. Functional Test 8.2 Screen

FUNCTIONAL TEST 9.1

RT-1539 PREPARATION:

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT ON

↑ UP

↓ DOWN

CE1ME168

Figure 7-104.41. Functional Test 9.1 Screen

FUNCTIONAL TEST 9.2

REQUIRED ACTIONS:

1. PRESS THEN RELEASE BIT PUSH BUTTON

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):

- LOADED DIRECTORY NO. LIGHT IS LIT ON
- LOADED FREQ. PLAN LIGTH IS LIT ON OR FLASHING
- SCANNING LIGTH IS ON

↑ UP

↓ DOWN

CE1ME169

I Figure 7-104.42. Functional Test 9.2 Screen

FUNCTIONAL TEST 9.3

REQUIRED ACTIONS:

- 1. WAIT FOR DNV T TO STOP RINGING**
2. PRESS THEN RELEASE BIT PUSH BUTTON
3. GO OFF-HOOK WITH THE DNV T WHEN IT IS RINGING
4. DIAL R 123 1234567

RESULTS:

1. DO YOU HEAR A WAITING TONE
THEN YOUR VOICE WHEN YOU ARE SPEAKING ? (Y/N):

↑ UP

↓ DOWN

CE1ME170

Figure 7-104.43. Functional Test 9.3 Screen

FUNCTIONAL TEST 9.4

REQUIRED ACTION:

1. GO ON-HOOK WITH THE DNV

PRESS ENTER TO CONTINUE

CE1ME171

FUNCTIONAL TEST 10.1

RT-1539 PREPARATION:

1. SET THE OFF/BLACKOUT/ON SWITCH TO OFF
2. WAIT AT LEAST 40 SECONDS
3. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
4. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
5. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME172

I Figure 7-104.45. Functional Test 10.1 Screen

FUNCTIONAL TEST 10.2

RESULT:

1. IS THE FREQ. PLAN LIGHT ON? (Y/N): _

CE1ME173

FUNCTIONAL TEST 11.1

RT-1539 PREPARATION:

1. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT

2. SET THE OFF/BLACKOUT/ON SWITCH TO OFF
3. SET THE NETWORK/RADIONET/STOR SWITCH TO RADIONET
4. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME174

Figure 7-104.47. Functional Test 11.1 Screen

FUNCTIONAL TEST 11.2

RESULT:

1. IS LOADED FREQ. PLAN LIGHT ON? (Y/N): _

CE1ME175

FUNCTIONAL TEST 12.1

RT-1539 PREPARATION

1. **VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT**
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT RADIONET
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT ON

↑ UP

↓ DOWN

CE1ME176

Figure 7-104.49. Functional Test 12.1 Screen

FUNCTIONAL TEST 12.2

REQUIRED ACTIONS:

1. **PULL AND PUSH DOWN ZERO/FILL SWITCH**
2. PUT ZERO/FILL SWITCH BACK IN ORIGINAL POSITION

RESULT:

1. IS CRYPTO ALARM LIGHT ON? (Y/N):

↑ UP

↓ DOWN

CE1ME177

RT-1539 KEY LOADING

LOADING PROCEDURES:

- 1. CONNECT THE KYK13 TO RT-1539 JS**
2. ACTIVATE THE ZERO/FILL SWITCH ON FILL FOUR TIMES
3. DISCONNECT THE KYK13 FROM RT-1539

↑ UP

↓ DOWN

CE1ME178

I Figure 7-104.51. Functional Test 13.1 Key Loading Screen

FUNCTIONAL TEST 13.1

RT-1539 PREPARATION:

1. SET THE OFF/BLACKOUT/ON SWITCH TO OFF
2. WAIT AT LEAST 40 SECONDS
3. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT MSRT
4. SET THE NETWORK/RADIONET/STOR SWITCH TO STORAGE
5. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME179

Figure 7-104.52. Functional Test 13.1 Screen

FUNCTIONAL TEST 13.2

REQUIRED ACTION:

1. WAIT AT LEAST 3 SECONDS

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):

- ALARM LIGHT IS ON
- LOADED FREQ. PLAN LIGHT IS FLASHING
- DNV T IS RINGING

↑ UP

↓ DOWN

CE1ME180

Figure 7-104.53. Functional Test 13.2 Screen

FUNCTIONAL TEST 14.1

RT-1539 PREPARATION:

1. CHECK THE OFF/BLACKOUT/ON SWITCH IS ON OFF
2. WAIT AT LEAST 40 SECONDS
3. SET THE RAU/MSRT/REMOTE SWITCH TO RAU
4. SET THE NETWORK/RADIONET/STOR SWITCH TO RADIONET
5. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME181

Figure 7-104.54. Functional Test 14.1 Screen

FUNCTIONAL TEST 14.2

REQUIRED ACTION:

1. WAIT AT LEAST 8 SECONDS

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):

- ALARM LIGHT IS ON
- LOADED FREQ. PLAN LIGTH IS FLASHING
- CRYPTO ALARM LIGHT IS ON

↑ UP

↓ DOWN

CE1ME182

Figure 7-104.55. Functional Test 14.2 Screen

FUNCTIONAL TEST 15.1

RT-1539 PREPARATION:

1. SET THE OFF/BLACKOUT/ON SWITCH TO OFF
2. WAIT AT LEAST 40 SECONDS
3. VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT RAU
4. SET THE NETWORK/RADIONET/STOR SWITCH TO NETWORK
5. SET THE OFF/BLACKOUT/ON SWITCH TO ON

↑ UP

↓ DOWN

CE1ME183

I Figure 7-104.56. Functional Test 15.1 Screen

FUNCTIONAL TEST 15.2

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):

- ALARM LIGHT IS ON
- CRYPTO ALARM LIGHT IS ON

↑ UP

↓ DOWN

CE1ME184

Figure 7-104.57. Functional Test 15.2 Screen

RT-1539 KEY LOADING

LOADING PROCEDURES:

1. **CONNECT THE KYK13 TO RT-1539 J3**
2. ACTIVATE THE ZERO/FILL SWITCH ON FILL FOUR TIMES
3. DISCONNECT THE KYK13 FROM RT-1539

↑ UP

↓ DOWN

CE1ME185

FUNCTIONAL TEST 16.1

RT-1539 PREPARATION

1. **VERIFY THE RAU/MSRT/REMOTE SWITCH IS AT RAU**
2. VERIFY THE NETWORK/RADIONET/STOR SWITCH IS AT NETWORK
3. VERIFY THE OFF/BLACKOUT/ON SWITCH IS AT ON
4. DISCONNECT CABLE W031 FROM RT-1539 J7

↑ UP

↓ DOWN

CE1ME186

Figure 7-104.59. Functional Test 16.1 Screen

FUNCTIONAL TEST 16.2

RESULTS:

1. ARE THE FOLLOWING CONDITIONS MET? (Y/N):

- ALARM LIGHT IS ON
- CRYPTO ALARM LIGHT IS ON

↑ UP

↓ DOWN

CE1ME187

RT-1539 TEST RESULTS

TESTING COMPLETE
UNIT UNDER TEST SUCCESSFULLY COMPLETED ALL TESTS
WITHOUT ANY DETECTED FAULTS

PRESS ENTER TO CONTINUE

CE1ME188

I Figure 7-104.61. RT-1539 Test Results Screen

RT-1539 REPAIR SESSION

FINAL PROCEDURES

1. SET THE RT-1539 OFF/BLACKOUT/ON SWITCH TO OFF
2. SET THE RT-1539 NETWORK/RADIONET/STOR SWITCH TO STOR
3. DISCONNECT ALL THE CABLES FROM THE RT-1539
4. DISCONNECT THE PROBE AND PUT IT BACK IN ITS PROTECTIVE ENCLOSURE
5. REMOVE THE TEST COVER
6. CLOSE THE RT-1539
7. SET THE ICD POWER SWITCH TO OFF

↑ UP

↓ DOWN

CE1ME189

Figure 7-104.62. RT-1539 Repair Session Final Procedures Screen

A >

A >

CE1ME190

Figure 7-104.63. MS-DOS Screen

Section IV. MAINTENANCE INSTRUCTIONS

7-8 GENERAL.

Direct support maintenance includes the removal and replacement of circuit card assemblies (CCAs), repair or replacement of backplane wiring, card nest connectors, power bus bars, and card nest coaxial cables. A faulty printed circuit card is returned to the manufacturer for repair.

Before attempting any of the following repair procedures, power down the RT-1539 and disconnect it from the external power source. Upon completion of a maintenance activity, verify the success of the repair by performing Built-in Test (BIT) before placing the RT-1539 back in service. In addition, visually inspect the RT-1539 at each opportunity for evidence of potential failure conditions such as lack of cleanliness, improper seating of connectors, loose hardware or other items, discoloration due to excessive heat, frayed cables or wiring, or bent wire wrap pins. Correct these conditions as necessary when observed. Figure 7-105 shows an overall view of RT-1539 subassemblies.

7-9 TORQUING.

7-9.1 5-mm Screws. The cabinet cover (A, fig. 7-106), 4PT1E and 4TP1E (B) module screws must be torqued to 70 inch-pounds. Start at position 1 and torque screws in designated order.

7-9.2 3-mm Screws. The 3-mm screws holding the power supply and transmitter-duplexer subassemblies must be torqued to 20.5 inch-pounds when these subassemblies are replaced.

7-10 POWER SUPPLY SUBASSEMBLY 4PT1E.

There are four modules comprising the power supply subassembly; 4PT1E (fig. 7-107), which houses 4PN1E(3), 4PP1E(2), and 4PX1E(1).

a. Removal.

- (1) Using 5-mm hex head key, loosen eight captive screws (fig. 7-107) securing module 4PT1E to rear of RT-1539.
- (2) Pull module 4PT1E straight out and remove.

NOTE

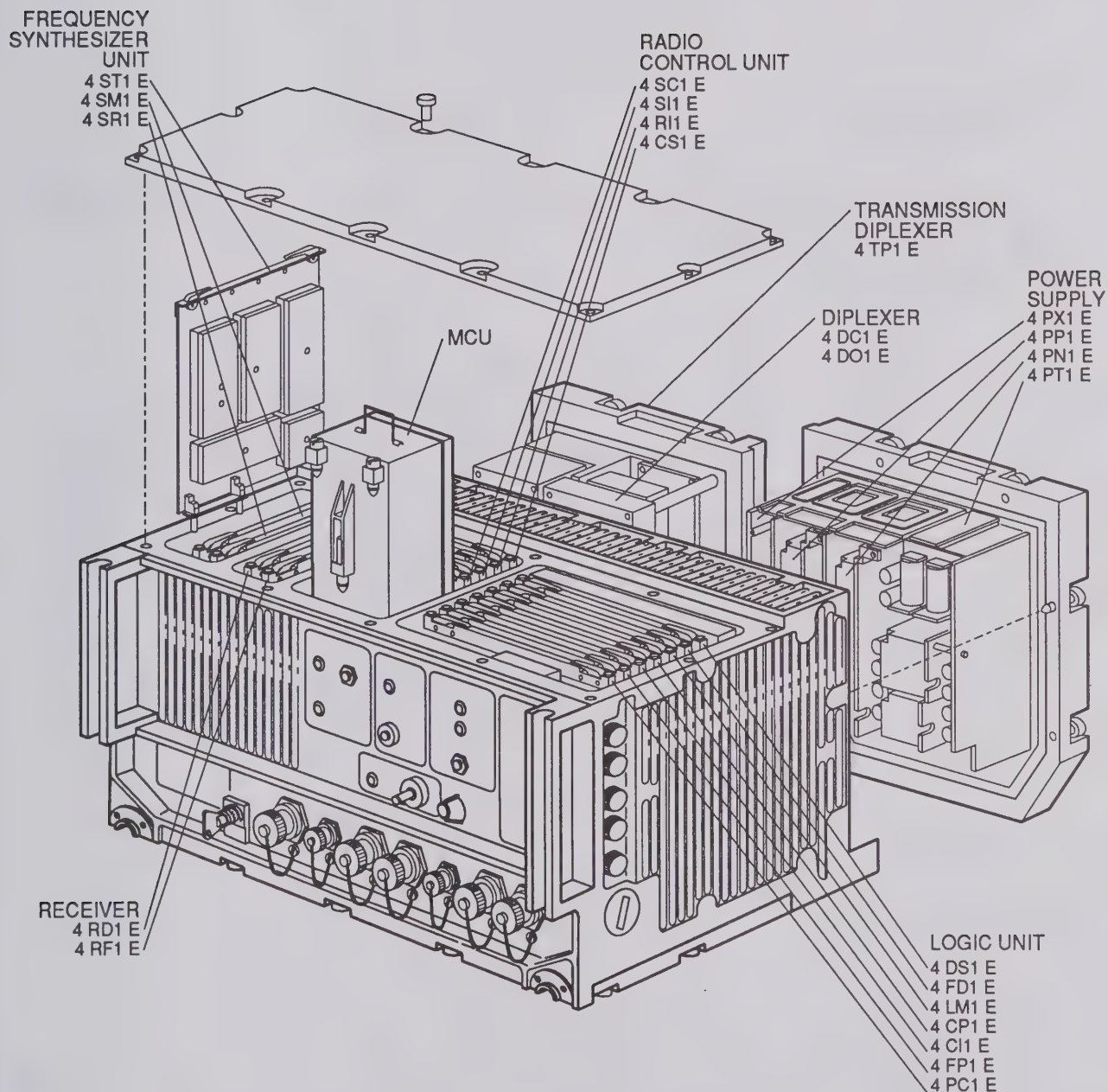
Perform following steps to remove CCAs
4PX1E, 4PP1E, and 4PN1E.

- (3) Using 3-mm hex head key, loosen two captive screws located by access holes at top and middle of CCA.

NOTE

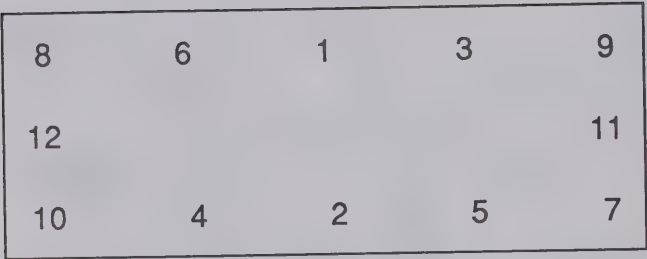
Use hex shaft at least 4-inches long to reach
socket heads of captive screws.

- (4) Using 3-mm hex head key, loosen two captive screws, located through access slots, at top and base of CCA.
- (5) Gently pull CCA away from 4PT1E.

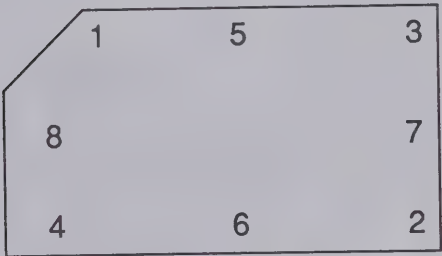


CE1ME004

Figure 7-105. RT-1539 Subassemblies



A. COVER



B. 4PT1E OR 4TP1E

CE1ME013

Figure 7-106. Torquing

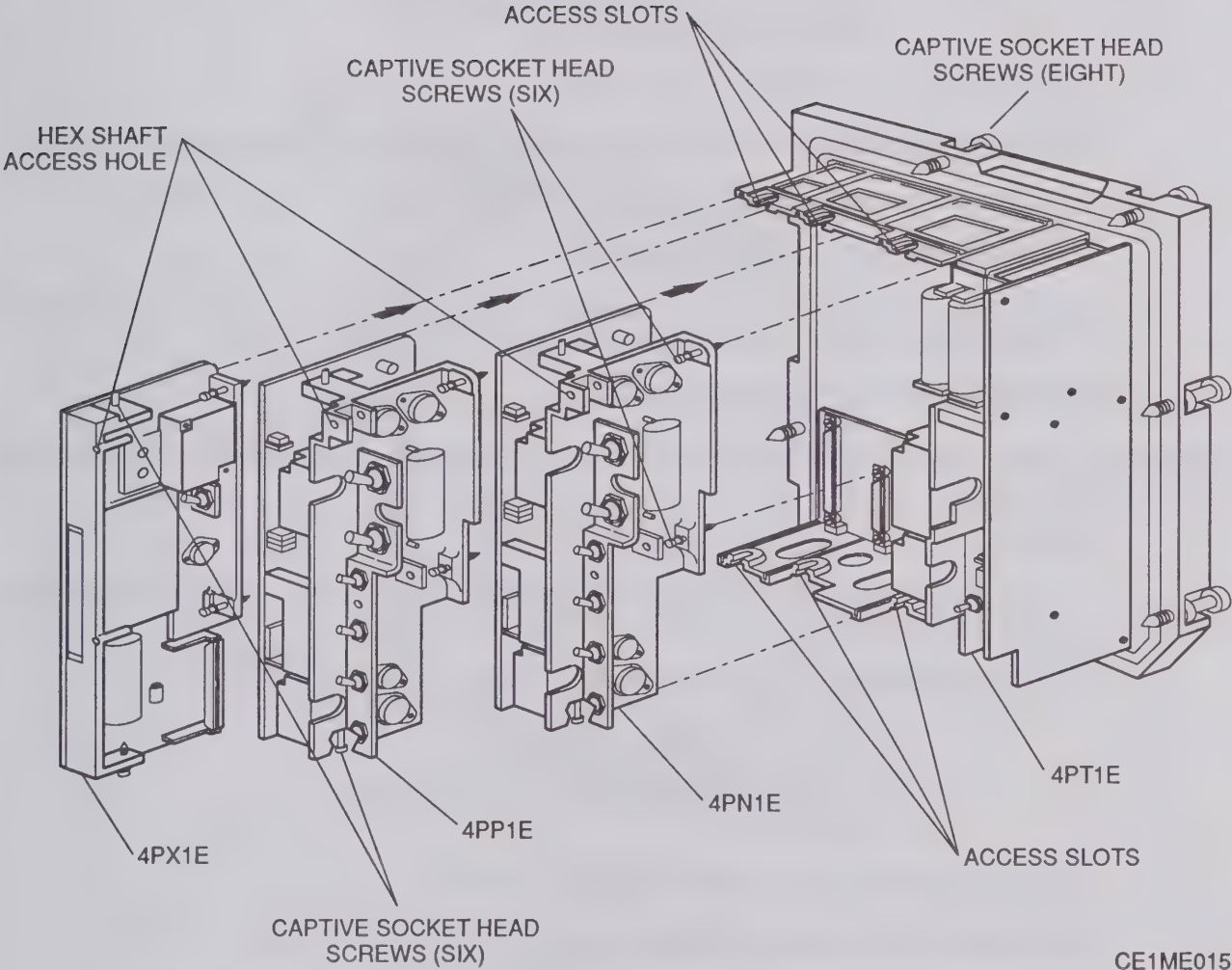


Figure 7-107. Power Supply Subassembly

b. Replacement.

NOTE

Do not force power supply subassembly into place or damage will occur to internal connectors or guide pins.

Perform steps a. through c. to install CCAs 4PX1E, 4PP1E, and 4PN1E.

- (1) Aline CCA into position on module 4PT1E.
- (2) Using 3-mm hex head key, tighten two captive screws located at top and base of CCA (fig. 7-107).
- (3) Tighten two captive screws located at side and middle of CCA .
- (4) Aline module 4PT1E to rear of RT-1539.
- (5) Using 5-mm hex head key, secure replacement module 4PT1E to rear of RT-1539 by tightening eight captive screws. Torque 5-mm screws to 70 inch-pounds (para 7-9.1).

7-11 TRANSMITTER-DIPLEXER 4TP1E.

This module contains either 4DC1E or 4DO1E diplexer modules according to frequency plan to be used, and module 4TP1E.

a. Removal.

- (1) Using 5-mm hex head key, loosen eight captive screws (fig. 7-108) securing module 4TP1E to rear panel of RT-1539.
- (2) Pull module straight out and remove from RT-1539.

NOTE

Perform following procedures to remove 4DC1E or 4DO1E.

- (3) Tag and disconnect three cables attached to diplexer.
- (4) Using 3-mm hex head key, loosen four captive screws securing diplexer to 4TP1E.
- (5) Pull diplexer away from 4TP1E.

b. Replacement.

- (1) Aline diplexer to module 4TP1E.
- (2) Using 3-mm hex head key, tighten four captive screws securing diplexer to 4TP1E (fig. 7-108). Torque 3-mm screws to 20.5 inch-pounds (para 7-9.2).
- (3) Connect three cables to diplexer and remove tags.
- (4) Aline module 4TP1E to rear panel of RT-1539.
- (5) Using 5-mm hex head key, secure module 4TP1E to rear panel of RT-1539 by tightening eight captive screws. Torque 5-mm screws to 70 inch-pounds (para 7-9.1).

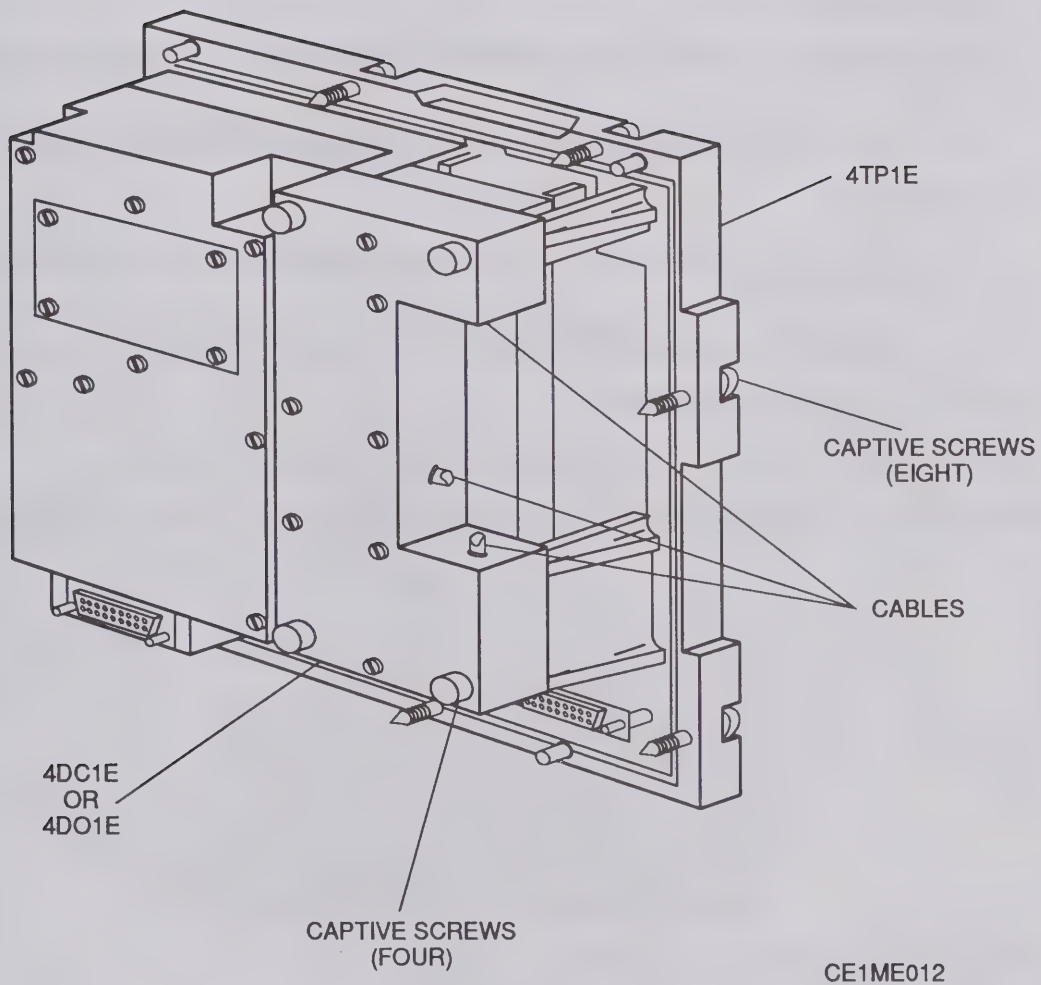


Figure 7-108. Transmitter-Diplexer

7-12 MOBILE COMSEC UNIT (MCU).

Before sending RT-1539 out for repair, zeroize MCU. Place **FREQ. PLAN** switch at **STOR** and place **FILL/ZERO** switch at **ZERO**. Remove the MCU (figs. 7-109 and 7-110) as follows:

a. Removal.

- (1) Using 5-mm hex head key remove RT-1539 case cover (2, fig. 7-109) by loosening 12 captive screws (1).
- (2) Remove cover.
- (3) Using flat tip screwdriver loosen three captive screws (1, fig. 7-110) securing MCU to RT-1539 case
- (4) Pull up on handle (2) located on top of MCU and lift MCU out of RT-1539 case (4).

b. Replacement.

- (1) Holding MCU by handle (2, fig. 7-110), align MCU above RT-1539. Gently slide MCU down into RT-1539 case (4).
- (2) Using flat tip screwdriver, secure MCU to RT-1539 case with three screws (1).
- (3) Replace RT-1539 case cover.
- (4) Perform paragraph 7-7.1 testing procedures to confirm normal operation.

7-13 RECEIVER CIRCUIT CARD ASSEMBLIES (CCA) 4RD1E AND 4RF1E.

CAUTION

Printed circuit cards contain Metal Oxide Semiconductor (MOS) devices which can be damaged by static discharge due to handling. Cards must be kept in special conductive plastic bags and removed only when transferred to be used in the equipment. Ensure that rubber mats and wrist straps are used at all times when handling these circuit cards outside the special conductive bags. Handle by edges only to avoid transfer of charge from body to MOS devices.

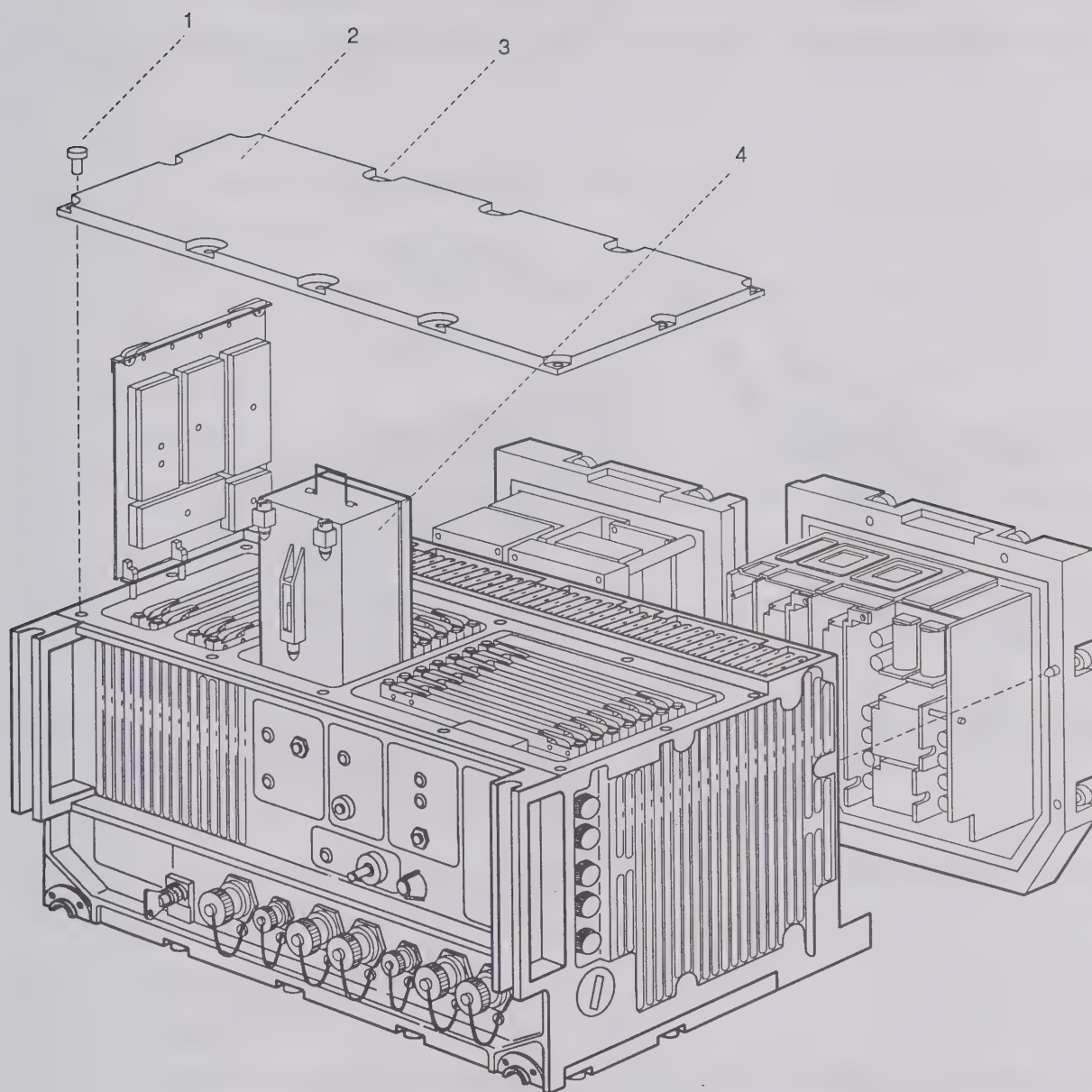
Refer to figure 7-105 for location of circuit cards.

a. Removal.

- (1) Using 5-mm hex head key, loosen 12 captive screws (1, fig. 7-109) to remove RT-1539 cover (2)
- (2) Pull up both levers on CCA at same time to disengage card from connector.
- (3) Pull CCA straight out of slot.

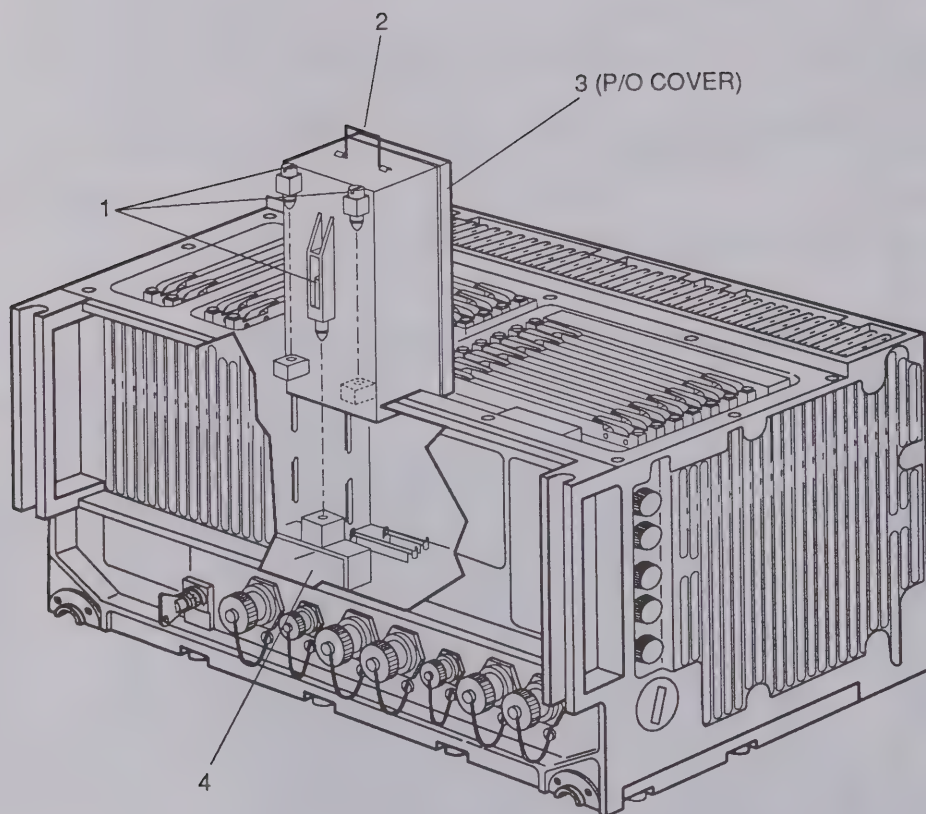
b. Replacement.

- (1) Align card in slot and carefully push in. As card begins to engage levers will begin to move in.
- (2) When card is properly in place, push both levers in at same time to engage card in connector.



CE1ME016

Figure 7-109. Mobile COMSEC Unit



CE1ME017

Figure 7-110. MCU Housing

- (3) Using 5-mm hex head key, tighten 12 captive screws securing RT-1539 cover (fig. 7-109). Torque 5-mm screws to 70 inch-pounds (para 7-9.1).
- (4) Perform paragraph 7-7.1 testing procedures to confirm normal operation.

7-14 FREQUENCY SYNTHESIZER UNIT CIRCUIT CARD ASSEMBLIES 4ST1E, 4SM1E, AND 4SR1E.

a. Removal.

- (1) Using 5-mm hex head key, loosen 12 captive screws (1, fig. 7-109) securing RT-1539 cover.
- (2) Remove cover.
- (3) Pull up both levers on CCA at same time to disengage card from connector.
- (4) Pull CCA straight out of slot.

b. Replacement.

- (1) Aline card in slot and carefully push in. As card begins to engage levers will begin to move in.
- (2) When card is properly in place, push both levers in at the same time to engage card in connector.
- (3) Replace cover.
- (4) Using 5-mm hex head key, tighten 12 captive screws (fig. 7-109) securing RT-1539 cover. Torque 5-mm screws to 70 inch-pounds (para 7-9.1).
- (5) Perform paragraph 7-7.1 testing procedures to confirm normal operation.

7-15 RADIO CONTROL UNIT CIRCUIT CARD ASSEMBLIES 4SC1E, 4SI1E, 4RI1E, AND 4CS1E.

a. Removal.

- (1) Using 5-mm hex head key, loosen 12 captive screws (1, fig. 7-109) securing RT-1539 cover.
- (2) Pull up both levers on CCA at same time to disengage card from connector.
- (3) Pull CCA straight out of slot.

b. Replacement.

- (1) Aline card in slot and carefully push in. As card begins to engage levers will begin to move in.
- (2) When card is properly in place, push both levers in at the same time to engage card in connector.
- (3) Using 5-mm hex head key, tighten 12 captive screws securing RT-1539 cover (fig. 7-109). Torque 5-mm screws to 70 inch-pounds (para 7-9.1).
- (4) Perform paragraph 7-7.1 testing procedures to confirm normal operation.

7-16 LOGIC UNIT CIRCUIT CARD ASSEMBLIES 4DS1E, 4FD1E, 4LM1E, 4CP1E, 4CI1E, 4FP1E, AND 4PC1E.

a. Removal.

- (1) Using 5-mm hex head key, loosen 12 captive screws (1, fig. 7-109) securing RT-1539 cover (2).
- (2) Pull up both levers on CCA at the same time to disengage card from connector.
- (3) Pull CCA straight out of slot.

b. Replacement.

- (1) Aline card in slot and carefully push in. As card begins to engage levers will begin to move in.
- (2) When card is properly in place, push both levers in at same time to engage card in connector.
- (3) Using 5-mm hex head key, tighten 12 captive screws (1, fig. 7-109) securing RT-1539 cover (2). Torque 5-mm screws to 70 inch-pounds (para 7-9.1).
- (4) Perform paragraph 7-7.1 testing procedures to confirm normal operation.

APPENDIX A

REFERENCES

DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms
DA Pam 738-750	The Army Maintenance Management System (TAMMS)
FM 21-11	First Aid for Soldiers
SB 11-604	Supply Bulletin for Tool Kit, Electronic Equipment, TK-105/G
SF Form 361	Transportation Discrepancy Report (TDR): AR 55-38
SF Form 364	Report of Discrepancy (ROD): AR 735-11-2
SF Form 368	Product Quality Deficiency Report
TB 9-6625-2147-35	Calibration Procedure for AN/PSM-45, MULTIMETER, DIGITAL
TB 43-0129	Safety Measures to be Observed when Installing and Using Whip Antennas, Field-Type Masts, Towers, Antennas, and Metal Poles that are used with Communications, Radar and Direction-Finding Equipment
TB 11-5800-216-15	Warrenty Program for MSE
TB 43-0118	Field Instructions for Painting and Preserving Electronic Communications Equipment
TM 11-5805-761-12&P	Operator's and Unit Maintenance Manual for Telephone, Digital, Non-Secure Voice TA-1035/U
TM 11-5810-329-10	Operator's Manual for TSEC/KY-68, DSVT
TM 11-5810-329-23	Organizational and Direct Support Miantenance Manual for TSEC/KY-68, DSVT
TM 11-5820-1022-13-2	Radio Access Unit AN/TRC-191
TM 11-6625-3052-14	Operator's Organizational, Direct Support, and General Support Maintenance Manual for AN/PSM-45, MULTI-METER, DIGITAL
TM 11-6625-3189-12&P	Operator's and Unit Maintenance Manual Including RPSTL for TEST SET RADIO AN/USM-626(V)
TM 750-244-2	Procedure for Destruction of Electronic Material to Prevent Enemy Use (Electronic Command)

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1 GENERAL.

This appendix provides for a summary of the maintenance operations for Receiver-Transmitter RT-1539. It authorizes levels of maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2 MAINTENANCE FUNCTION.

Maintenance functions will be limited to and defined as follows:

- a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.
- b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- c. Service. Operations required periodically to keep an item in proper operating condition, i.e, to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.
- e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. Calibrate. To determine and then correct or adjust in instruments or test measuring and diagnostic equipment used in precision measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.
- h. Replace. The act of substituting a serviceable like-type part, subassembly, or module (component or assembly) for an unserviceable counterpart.
- i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
- j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3 COLUMN ENTRIES (SECTION II).

a. Column (1) - Group Number. Column (1) lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column (2) - Component/Assembly. Column (2) contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column (3) - Maintenance Functions. Column (3) lists the functions to be performed on the item listed in column (2). When items are listed without maintenance functions, it is solely for the purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column (4) - Maintenance Level. Column (4) specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column (3). This figure represents the active time in hours required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate "worktime" figures will be shown for each level. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column (4) are as follows:

Unit

C - Operator/Crew

O - Organizational

Intermediate

F - Intermediate Direct Support

H - General Support (L is Specialized Repair Activity)

Depot

D - Depot

e. Column (5) - Tools and Equipment. Column (5) specifies by code, those common tool sets (not individual tools) and specified tools, test, and support equipment required to perform the designated function.

f. Column (6) - Remarks. Column (6) contains an alphabetic code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4 TOOL AND TEST EQUIPMENT REQUIREMENTS (SECTION III).

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment of the maintenance function.

b. Maintenance Level. The codes in this column indicate the maintenance level allocated the tools or test equipment.

c. Nomenclature. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for Manufacturers (5 digits) in parentheses.

d. National/NATO Stock Number. This column lists the National/NATO Stock Number of the specific tools or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for Manufacturers (5-digit) in parentheses.

B-5 REMARKS (SECTION IV).

a. Reference Code. This code refers to the appropriate item in Section II, column (6).

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in Section II.

SECTION II MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			UNIT		INTRMDTE		DPT		
			C	O	F	H	D		
00	RECEIVER- TRANSMITTER RT-1539 A(P)(C)/G	INSPECT	0.1						A
		TEST		0.7					B
		REPAIR		0.4					C
		REPLACE		0.2					
01	CIRCUIT CARD ASSEMBLY, 4RF1E	TEST			0.7			1,2,3,5, 6,7,8	F
		REPAIR			0.2			1,2,4,5, 6,7,8	F
		REPAIR					*		D
		REPAIR			0.2		*	4	D
02	CIRCUIT CARD ASSEMBLY, 4RD1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
03	CIRCUIT CARD ASSEMBLY, 4SR1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
04	CIRCUIT CARD ASSEMBLY, 4SM1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
05	CIRCUIT CARD ASSEMBLY, 4ST1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
06	CIRCUIT CARD ASSEMBLY, 4SC1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
07	CIRCUIT CARD ASSEMBLY, 4SI1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D
08	CIRCUIT CARD ASSEMBLY, 4RI1E	REPLACE			0.2			4	
		REPAIR					*		D
		REPAIR			0.2		*	4	
		REPAIR					*		D

SECTION II MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			UNIT		INTRMDTE		DPT		
			C	O	F	H	D		
09	CIRCUIT CARD ASSEMBLY, 4CS1E	REPLACE REPAIR			0.2		*	4	D
10	CIRCUIT CARD ASSEMBLY, 4DS1E	REPLACE REPAIR			0.2		*	4	D
11	CIRCUIT CARD ASSEMBLY, 4FD1E	REPLACE REPAIR			0.2		*	4	D
12	CIRCUIT CARD ASSEMBLY, 4LM1E	REPLACE REPAIR			0.2		*	4	D
13	CIRCUIT CARD ASSEMBLY, 4CP1E	REPLACE REPAIR			0.2		*	4	D
14	CIRCUIT CARD ASSEMBLY, 4CI1E	REPLACE REPAIR			0.2		*	4	D
15	CIRCUIT CARD ASSEMBLY, 4FP1E	REPLACE REPAIR			0.2		*	4	D
16	CIRCUIT CARD ASSEMBLY, 4PC1E	REPLACE REPAIR			0.2		*	4	D
17	ASSEMBLY, TRANSMITTER- DIPLEXER	REPLACE REPAIR			0.4		*	4	D
1701	MODULE SUBASSEMBLY 4TP1E	REPLACE REPAIR			0.4		*	4	D

SECTION II MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			UNIT		INTRMDTE		DPT		
			C	O	F	H	D		
1702	MODULE SUBASSEMBLY 4DC1E (CONUS) OR 4DO1E (OCONUS)	REPLACE REPAIR			0.4		*	4	D
18	ASSEMBLY, POWER SUPPLY	REPLACE REPAIR			0.4		*	4	D
1801	MODULE SUB- ASSEMBLY 4PX1E	REPLACE REPAIR			0.4		*		D
1802	MODULE SUB- ASSEMBLY 4PP1E	REPLACE REPAIR			0.4		*		D
1803	MODULE SUB- ASSEMBLY 4PN1E	REPLACE REPAIR			0.4		*		D
1804	MODULE SUB- ASSEMBLY REPAIR 4PT1E	REPLACE			0.4	*		D	
19	VOICE & DATA ENCRYPTION DEVICE MO-3(C)/G	REPLACE REPAIR			0.2		*	4	D
20	CASE ASSEM- BLY, WIRE	INSPECT TEST REPAIR	0.1		0.7		*	1,2,3,5,6 7,8	A F D

SECTION III TOOLS AND TEST EQUIPMENT

TOOLS OR TEST EQUIPMENT REF. CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NSN/NATO STOCK NUMBER	TOOL NUMBER
1	F	DIGITAL NONSECURE VOICE TERMINAL TA-1035(U)	5805-01-246-6826	
2	F	POWER SUPPLY HP-6247B	6130-00-160-0827	
3	F	MULTIMETER, DIGITAL AN/PSM-45	6625-01-139-2512	
4	F	TOOL KIT ELECTRONIC EQUIPMENT, TK-105/G	5180-00-610-8177	
5	F	KEY FILL DEVICE KYK-13/TSEC	5810-01-026-9618	
6	F	TEST SET, RADIO AN/USM 626 (V)1 or (V)2	6625-01-250-1373 6625-01-274-9550	
7	F	CABLE, FILL	5810-01-066-7587	
8	F	CABLE ASSEMBLY, ELEC-SIGNAL	5995-01-314-5248	

SECTION III TOOLS AND TEST EQUIPMENT

TOOLS OR TEST EQUIPMENT REF. CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NSN/NATO STOCK NUMBER	TOOL NUMBER
All data on page B-8 has been deleted.				

SECTION IV REMARKS

REFERENCE CODE	REMARKS
A	VISUAL
B	TEST USING BIT AND BATTERY TEST
C	REPAIR BY REPLACEMENT OF FUSES, BATTERY, O RING, CAPS, KNOBS, GROUND STRAP TERMINAL OR DECOMPRESSION SCREW
D	(*)REFER TO AUTOMATIC RETURN ITEMS LIST (ARIL) FOR SOURCE OF REPAIR
E	REMARK NOT USED
F	USE OF POWER SUPPLY FOR NON-SIGNAL BATTALION

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1 SCOPE.

The appendix lists expendable supplies and materials you will need to operate and maintain the Receiver-Transmitter RT-1539 (P)A (C)/G. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

E-2 EXPLANATION OF COLUMNS.

E-2.1 Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., Use cleaning compound, item 5, App. D)

E-2.2 Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H- General Support Maintenance

E-2.3 Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

E-2.4 Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses followed, if applicable.

E-2.5 Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g. ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS.
1	O	8305-00-267-3015	Cloth, Cotton, Cheesecloth CCC-C-440 (81348)	YD
2	O	8010-00-297-2124	Enamel, Semigloss, OD TT-E-485 (81348)	QT
3	O	8010-00-582-5318	Primer, Zinc chromate TT-P-1757 (81348)	QT
4	O	5350-00-186-8854	Sandpaper, Fine, No. 0000 A-A-1049 TY2 (58536)	100 EA
5	O	8020-00-262-9084	Brush, Paint, Flat 1/2 inch MS16865 (96906)	EA
6	O	7510-00-266-6712	Tape, Pressure sensitive PPP-T-42 (81348)	RO
7	O,F	6810-00-292-9625	Cleaning compound, Trichlorotrifluoroethane MIL-C-81302 (81349)	QT

APPENDIX F

OPERATOR'S, UNIT AND DIRECT SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

F-1. Scope.

This appendix lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit and direct support maintenance of the RT-1539A(P)(C)/G. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

F-2. General.

This Repair Parts and Special Tools List (RPSTL) is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending numeric sequence, with the parts in each group listed in ascending item number sequence. Figure numbers are listed directly beneath the group header.

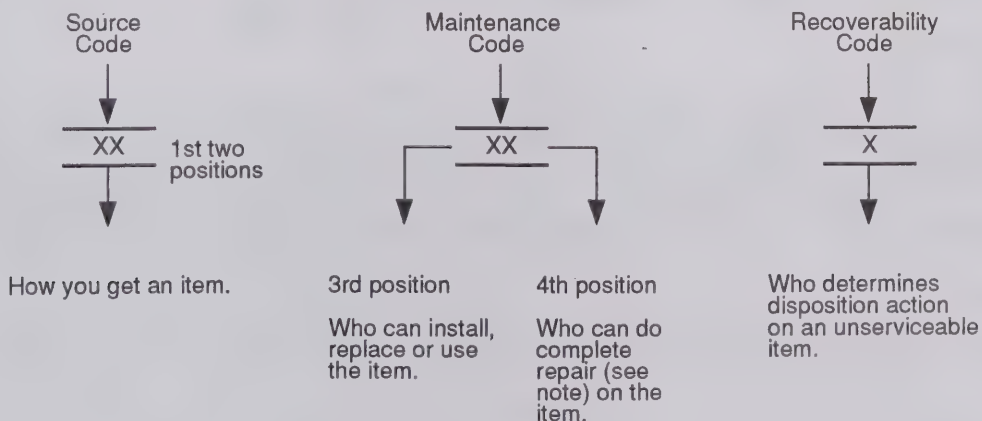
b. Section III. Special Tools List. Not applicable.

c. Section IV. Cross-Reference Indexes. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. The figure number and item number index lists figure and item numbers in numeric sequence and cross-references National stock number, Commercial and Government Entity Code (CAGEC) and part numbers.

F-3. Explanation of Columns (Sections II and III).

a. Item No. (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR Code (Column (2)). The source, maintenance, and recoverability (SMR) code is a five-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instructions, as shown in the following breakout:



NOTE

Complete repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) *Source code.* The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Code

Explanation

PA
PB
PC
PD
PE
PG

Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the third position of the SMR code.

NOTE

Items coded PC are subject to deterioration.

KD
KF
KB

Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.

MO - Made at org
AVUM category
MF - Made at DS/
AVIM category
MH - Made at GS
category
ML - Made at Spe-
cialized Repair
Activity (SRA)
MD - Made at Depot

Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the description and usable on code (UOC) column and listed in the Bulk Material group of the repair parts list. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at a higher category, order the item from the higher category of maintenance.

AO - Assembled
org/AVUM
category
AF - Assembled by
DS/AVIM
category
AL - Assembled by
SRA
AD - Assembled by
Depot

Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the category of maintenance indicated by the source code. If the third position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher category, order the item from the higher category of maintenance.

<i>Code</i>	<i>Explanation</i>
XA -	Do not requisition an "XA" coded item. Order its next higher assembly.
XB -	If an "XB" item is not available from salvage, order it using CAGEC and part number given.
XC -	Installation drawing, diagram, instruction sheet, field service drawing that is identified by manufacturers part number.
XD -	Item is not stocked. Order an "XD" coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

(2) *Maintenance code.* Maintenance codes tell you the category of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance category authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following categories of maintenance.

<i>Code</i>	<i>Application/Explanation</i>
C -	Crew or operator maintenance done within organizational or aviation unit maintenance.
O -	Organizational or aviation unit category can remove, replace, and use the item.
F -	Direct support or aviation intermediate category can remove, replace, and use the item.
H -	General support category can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
D -	Depot category can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance category with the capability to do complete repair (i.e., perform all authorized repair functions). This position will contain one of the following maintenance codes.

NOTE

Some limited repair may be done on the item at a lower category of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

<i>Code</i>	<i>Application/Explanation</i>
O -	Organizational or aviation unit is the lowest category that can do complete repair of the item.
F -	Direct support or aviation intermediate is the lowest category that can do complete repair of the item.
H -	General support is the lowest category that can do complete repair of the item.
L -	Specialized repair activity is the lowest category that can do complete repair of the item.
D -	Depot is the lowest category that can do complete repair of the item
Z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user category.

(3) *Recoverability code.* Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR code as follows:

<i>Recoverability Codes</i>	<i>Application/Explanation</i>
Z	- Nonreparable item. When unserviceable, condemn and dispose of the item at the category of maintenance shown in the third position of SMR code.
O	- Reparable item. When uneconomically reparable, condemn and dispose of the item at organizational or aviation unit category.
F	- Reparable item. When uneconomically reparable, condemn and dispose of the item at direct support or aviation intermediate category.
H	- Reparable item. When uneconomically reparable, condemn and dispose of the item at general support category.
D	- Reparable item. When beyond lower category repair capability, return to depot. Condemnation and disposal of item not authorized below depot category.
L	- Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	- Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instruction.

c. *CAGEC (Column (3)).* The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. *Part Number (Column (4)).* Indicates the primary number used by the manufacturer (individual, company, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. *Description and Usable on Code (UOC) (Column (5)).* This column includes the following information:

- (1) The Federal Item name and, when required, a minimum description to identify the item.
- (2) The statement "END OF FIGURE" appears just below the last item description in Column (5) for a given figure in both sections II and III.

f. *Qty (Column (6)).* Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

F-4. Explanation of Columns (Section IV).

a. *National Stock Number (NSN) Index.*

(1) *Stock number column.* This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. When requisitioning items, use the complete NSN (13 digits).

(2) *Fig. column.* This column lists the number of the figure where the item is identified/located. The illustrations are in numerical sequence in sections II and III.

(3) *Item column.* The item number identifies the item associated with the figure listed in the adjacent Fig. column. This item is also identified by the NSN listed on the same line.

(3) *Item column.* The item number identifies the item associated with the figure listed in the adjacent Fig. column. This item is also identified by the NSN listed on the same line.

b. Part Number Index. Part numbers in this index are listed by part number in ascending alphanumeric sequence.

(1) *CAGEC column.* This column lists the Commercial and Government Entity Code (CAGEC).

(2) *Part number column.* This column indicates the part number assigned to the item.

(3) *Stock number column.* This column lists the National stock number for the associated part number and manufacturer identified in the part number and CAGEC columns to the left.

(4) *Fig. column.* This column lists the number of the figure where the item is identified/located in sections II and III.

(5) *Item column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. Figure and Item Number Index.

(1) *Fig. column.* This column lists the number of the figure where the item is identified/located in sections II and III.

(2) *Item column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) *Stock number column.* This column lists the National stock number for the item.

(4) *CAGEC column.* The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) *Part number column.* Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

F-5. Special Information.

National Stock Numbers. National stock numbers (NSNs) that are missing from P source coded items have been applied for and will be added to this TM by future change/revision when they are entered in the Army Master Data File (AMDF). Until the NSNs are established and published, submit exception requisitions to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM, Fort Monmouth, New Jersey 07703-5007 for the part required to support your equipment.

F-6. How to Locate Repair Parts.

a. When National stock number or part number is not known.

(1) *First.* Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) *Second.* Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) *Third.* Identify the item on the figure and note the item number.

(4) *Fourth.* Refer to the Repair Parts List for the figure to find the part number for the item number noted

on the figure.

(5) *Fifth.* Refer to the Part Number Index to find NSN, if assigned.

b. When National stock number or part is known.

(1) *First.* Using the index of National stock numbers and part numbers, find the pertinent National stock number or part number. The NSN index is in National item identification number (NIIN) sequence (para 4a(1)). The part numbers in the part number index are listed in ascending alphanumeric sequence (para 4b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) *Second.* After finding the figure and item number, verify that the item is the one you are looking for, then locate the item number in the repair parts list for the figure.

F-7. Abbreviations.

Not applicable.

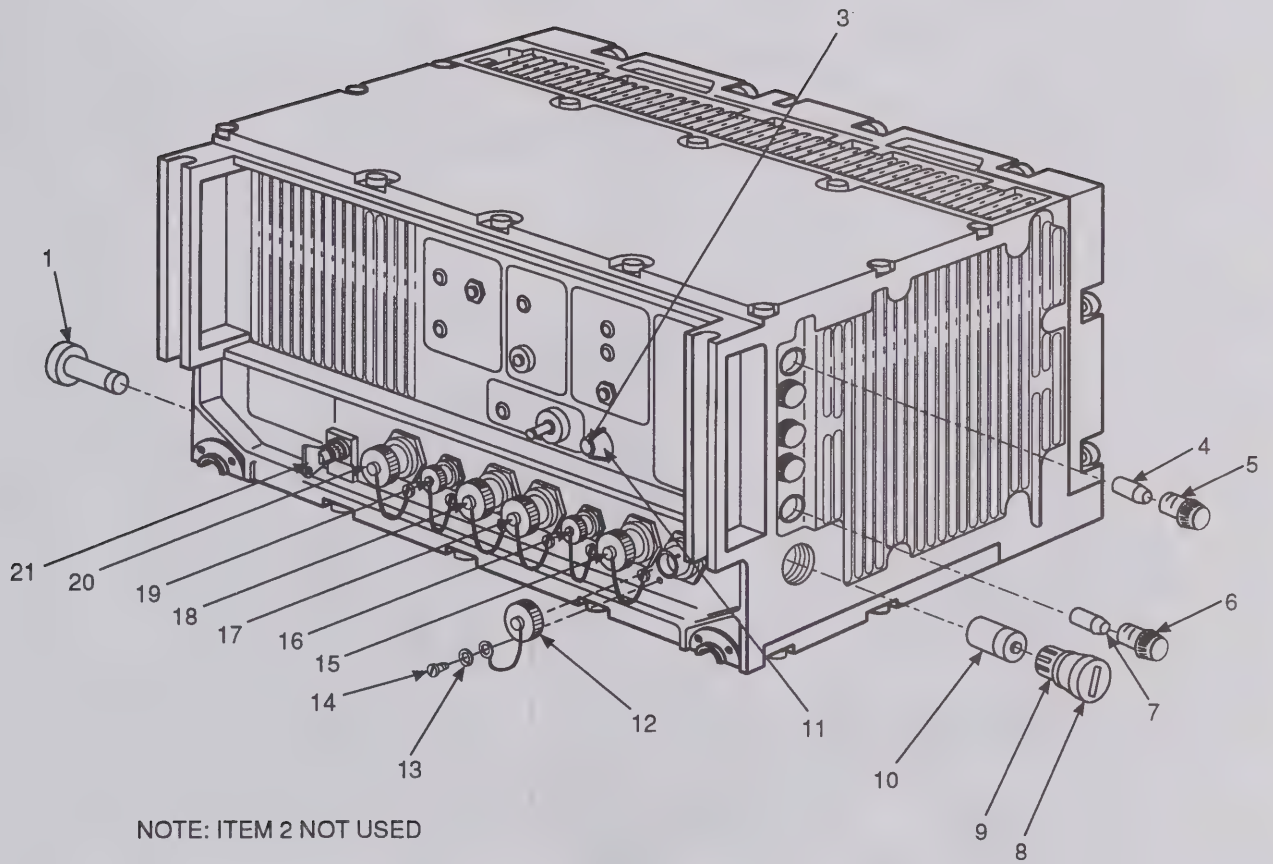
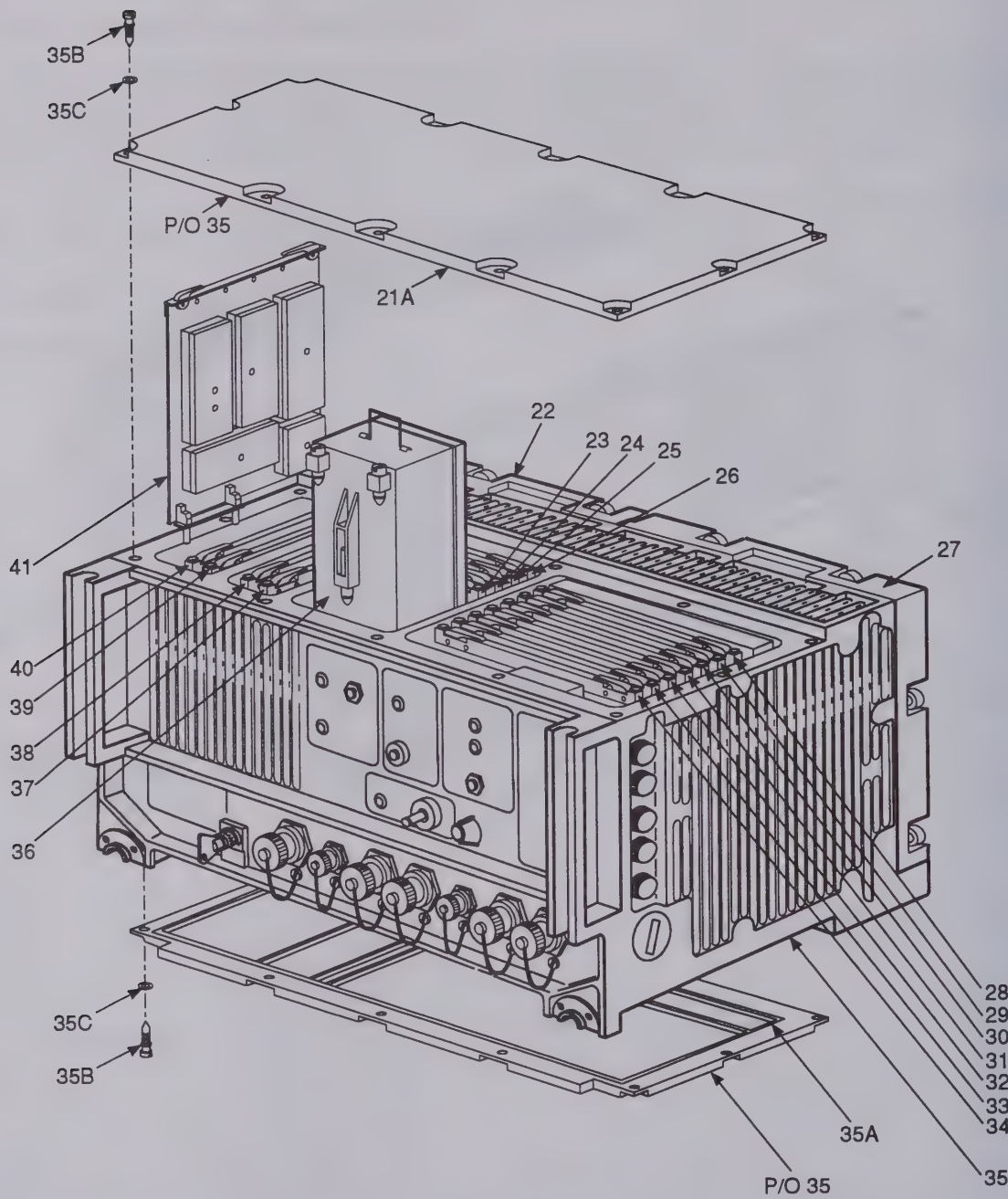


Figure F-1. Receiver-Transmitter, RT-1539A(P)(C)/G (Sheet 1 of 2)



CE1ME901

Figure F-1. Receiver-Transmitter, RT-1539A(P)(C)/G (Sheet 2 of 2)

SECTION II			TM11-5820-1027-13&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
				GROUP 00 RECEIVER-TRANSMITTER	
				RT-1539A(P)(C)/G	

FIGURE F-1

1	PAOZZ	F7377	U10799-00	VALVE,ASSEMBLY.....	1
3	PAOZZ	67032	U08657-18	CAP,KNOB ATTACHMENT.....	1
4	PAOZZ	F7377	U08662-03	FUSE,CARTRIDGE.....	4
5	PAOZZ	F7377	U08662-01	FUSEHOLDER,EXTRACTO.....	4
6	PAOZZ	F7377	U08662-02	FUSEHOLDER,EXTRACTO.....	1
7	PAOZZ	14933	HA39-16	FUSE,CARTRIDGE.....	1
8	PAOZZ	F6495	U11092-00	FILLER CAP BATTERY.....	1
9	PAOZZ	F7377	U07290-00	PACKING,PREFORMED.....	1
10	PAOZZ	80058	BA-5372/U	BATTERY,NONRECHARGE.....	1
11	PAOZZ	F7377	U08665-01	KNOB.....	1
12	PAOZZ	96906	MS27502B15C	COVER,ELECTRICAL CO.....	1
13	PAOZZ	F0110	E27620-30CCT	WASHER,SPRING TENS.....	8
14	PAOZZ	F0110	E27115C30Q6CCT	SCREW,MACHINE.....	8
15	PAOZZ	96906	MS27502B13C	COVER,ELECTRICAL CO.....	1
16	PAOZZ	96906	MS27502B9C	COVER,ELECTRICAL CO.....	1
17	PAOZZ	96906	MS27502B11C	COVER,ELECTRICAL CO.....	1
18	PAOZZ	25330	GC822-1	CAP,PROTECTIVE,DUST.....	1
19	PAOZZ	F4305	SER343	COVER,ELECTRICAL CO.....	1
20	PAOZZ	F4305	SER344	COVER,ELECTRICAL CO.....	1
21	XBOZZ	F6495	U08660-03	TERMINAL STRIP,GROU.....	1
21A	PAFZZ	F7377	U08115-00	GASKET.....	1
22	XBFDA	67032	U08246-00	TRANSMITTER-DIPLEXE.....	1
23	PAFDA	67032	U08267-00	CIRCUIT CARD ASSEMB -4SC1E.....	1
24	PAFDA	67032	U08271-00	CIRCUIT CARD ASSEMB -4SI1E.....	1
25	PAFDA	67032	U08269-00	CIRCUIT CARD ASSEMB -4RI1E.....	1
26	PAFDA	67032	U08273-01	CIRCUIT CARD ASSEMB -4CS1E.....	1
27	PAFDA	67032	U08247-00	POWER SUPPLY ASSY.....	1
28	PAFDA	67032	U08285-00	CIRCUIT CARD ASSEMB -4DS1E.....	1
29	PAFDA	67032	U08283-00	CIRCUIT CARD ASSEMB -4FD1E.....	1
30	PAFDA	67032	U08287-01	CIRCUIT CARD ASSEMB -4LM1E.....	1
31	PAFDA	67032	U08275-01	CIRCUIT CARD ASSEMB -4CP1E.....	1
32	PAFDA	67032	U08279-00	CIRCUIT CARD ASSEMB -4CI1E.....	1
33	PAFDA	67032	U08281-00	CIRCUIT CARD ASSEMB -4FP1E.....	1
34	PAFDA	67032	U08277-02	CIRCUIT CARD ASSEMB -4PC1E.....	1
35	PAFFF	67032	U08248-00	RECEIVER-TRANSMITTE.....	1
35A	PAFZZ	F7377	U08116-00	GASKET.....	1
35B	PAFZZ	F7377	U07095-00	SCREW ASSEMBLY,PANE.....	24
35C	PAFZZ	F7377	U07097-00	WASHER,FLAT.....	24
36	PDFDA	98230	0N409500-502	MOBILE COMSEC UNIT.....	1
37	PAFDA	67032	U08260-00	CIRCUIT CARD ASSEMB -4RF1E.....	1
38	PAFDA	67032	U08255-01	CIRCUIT CARD ASSEMB -4RD1E.....	1
39	PAFDA	67032	U08253-00	CIRCUIT CARD ASSEMB -4SR1E.....	1
40	PAFDA	67032	U08251-00	CIRCUIT CARD ASSEMB -4SM1E.....	1
41	PAFDA	67032	U08249-00	CIRCUIT CARD ASSEMB -4ST1E.....	1

END OF FIGURE

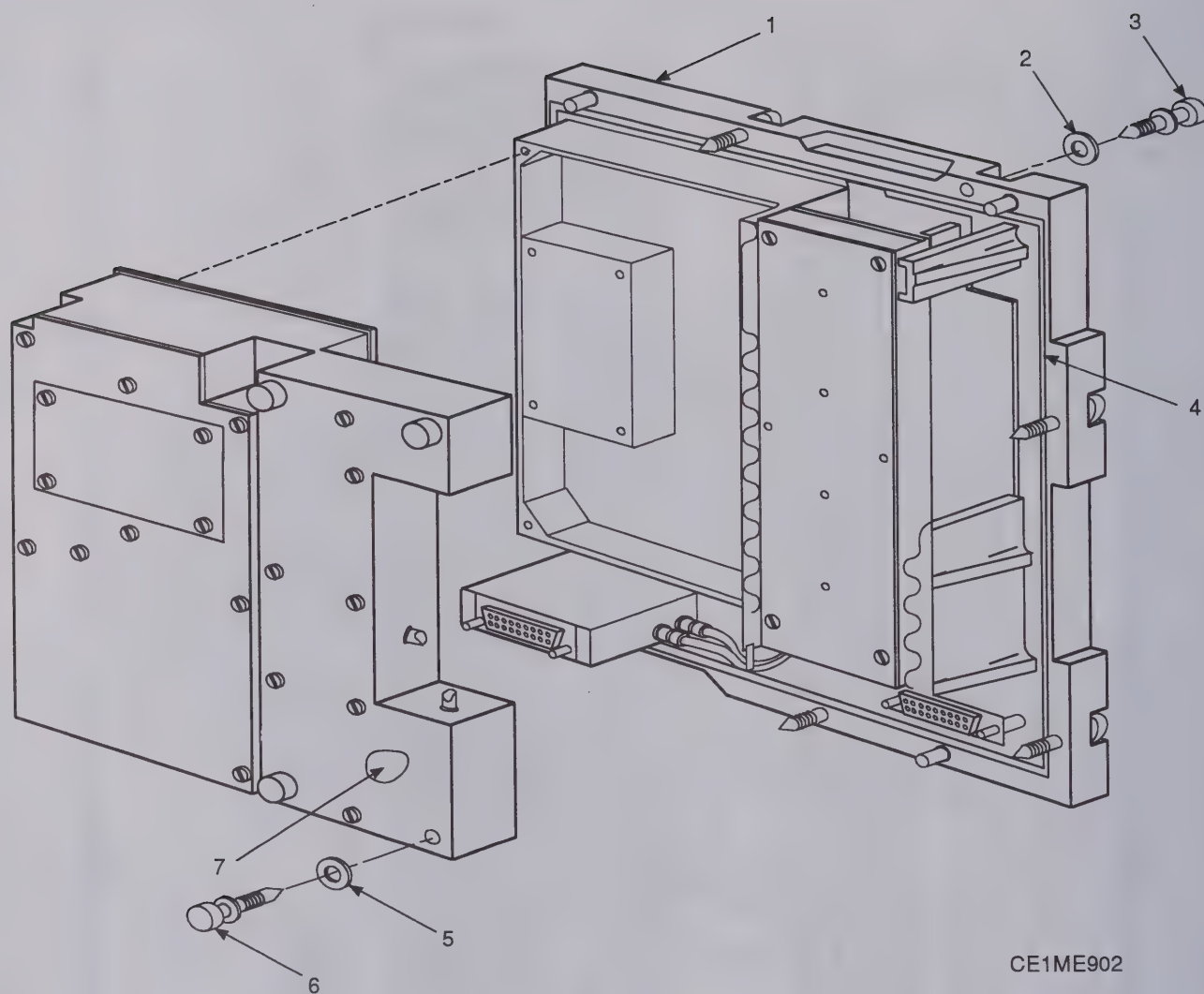


Figure F-2. Assembly, Transmitter-Diplexer

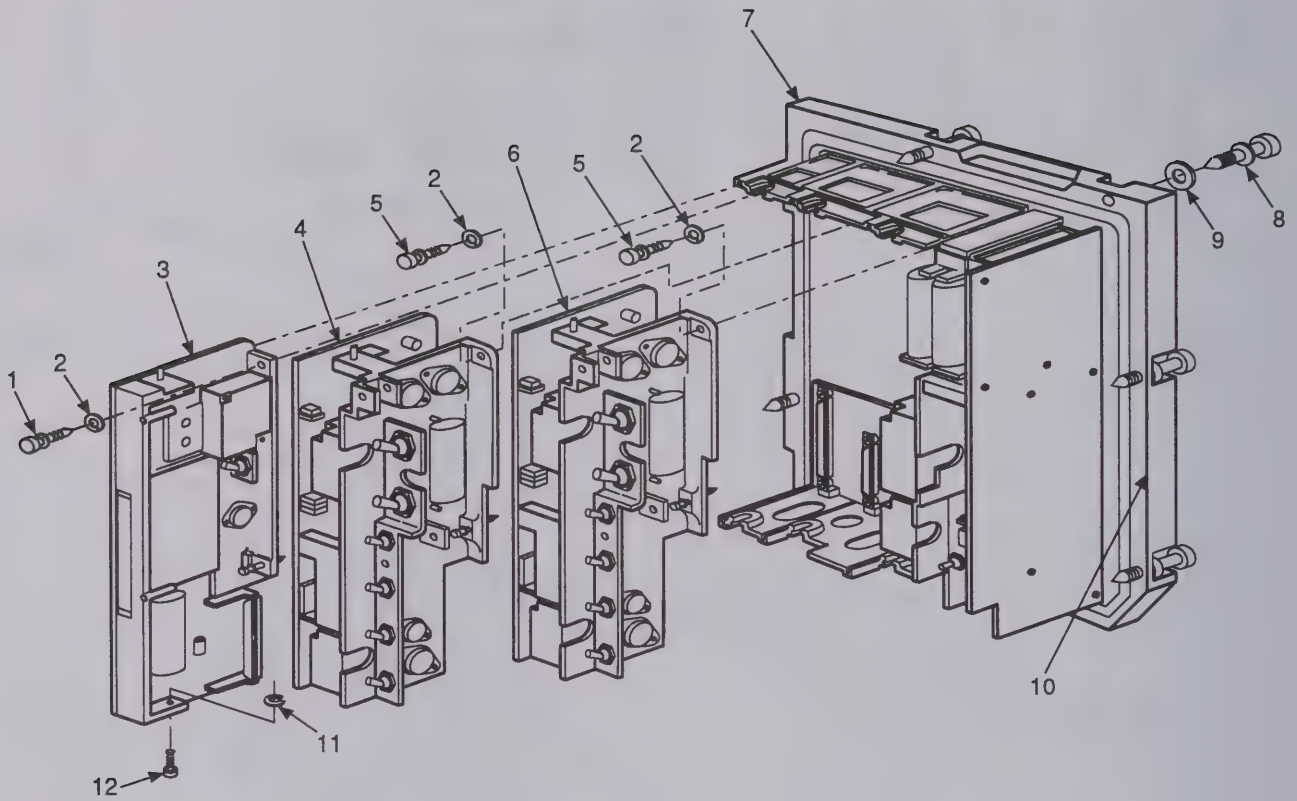
SECTION II			TM11-5820-1027-13&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 17 ASSEMBLY, TRANSMITTER
DIPLEXER

FIGURE F-2

1	PAFDA	67032	U08295-01	MODULE -4TP1E.....	1
2	PAFZZ	F7377	U07097-00	WASHER,FLAT.....	8
3	PAFZZ	F7377	U07095-00	SCREW ASSEMBLY,PANE.....	8
4	XBFZZ	F7377	U08117-00	GASKET.....	1
5	PAFZZ	F0349	500401-80	WASHER,SPRING TENSI.....	4
6	PAFZZ	F7377	U06145-00	SCREW ASSEMBLY,PANE.....	4
7	PAFDA	67032	U08289-00	CIRCUIT CARD ASSEMB -4DC1E.....	1
7	PAFDA	67032	U08292-00	CIRCUIT CARD ASSEMB -4D01E.....	1

END OF FIGURE



CE1ME903

Figure F-3. Assembly, Power Supply

SECTION II			TM11-5820-1027-13&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY

GROUP 18 ASSEMBLY, POWER SUPPLY

FIGURE F-3

1	PAFZZ	F7377	U08234-00	SCREW,ASSEMBLY PANE.....	4
2	PAFZZ	F0110	E27620-40CCT	WASHER,LOCK.....	6
3	PAFDA	67032	U08330-00	MODULE -4PX1E.....	1
4	PAFDA	67032	U08327-00	MODULE -4PP1E.....	1
5	PAFZZ	F7377	U07096-00	SCREW,ASSEMBLY PANE.....	2
6	PAFDA	67032	U08320-00	MODULE -4PN1E.....	1
7	PAFDA	67032	U08332-00	MODULE -4PT1E.....	1
8	PAFZZ	F7377	U07095-00	SCREW ASSEMBLY,PANE.....	8
9	PAFZZ	F7377	U07097-00	WASHER,FLAT.....	8
10	PAFZZ	F7377	U08118-00	GASKET.....	1
11	XBFZZ	F0349	864-030-70	RING,RETAINING.....	6
12	PAFZZ	F7377	U08631-00	SCREW,MACHINE.....	6

END OF FIGURE

SECTION IV

TM11-5820-1027-13&P

CROSS-REFERENCE INDEXES

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM	FIG.	ITEM
5935-00-410-8504	F-1	15	5310-14-421-8313	F-3	2		
5935-00-487-8670	F-1	12	5330-14-422-6902	F-1	35A		
5935-01-026-2308	F-1	17	5305-14-422-6911	F-1	35B		
5935-01-120-9246	F-1	16		F-2	3		
6135-01-214-6441	F-1	10		F-3	8		
5998-01-254-0816	F-1	37	5305-14-422-6912	F-2	6		
6130-01-254-6692	F-1	27	5305-14-422-6916	F-3	12		
6130-01-254-6693	F-3	4	5330-14-422-8678	F-1	9		
6130-01-254-6694	F-3	6					
6130-01-254-6695	F-3	7					
5998-01-254-6707	F-1	39					
5998-01-254-6708	F-1	40					
5998-01-254-6709	F-1	41					
5998-01-254-6710	F-1	23					
5998-01-254-6711	F-1	24					
5998-01-254-6712	F-1	25					
5998-01-254-6714	F-1	28					
5998-01-254-6715	F-1	29					
5998-01-254-6718	F-1	32					
5998-01-254-6719	F-1	33					
5998-01-254-6721	F-2	7					
5998-01-254-6722	F-2	7					
6130-01-255-4149	F-3	3					
5920-01-257-2881	F-1	4					
5920-01-257-2882	F-1	7					
5340-01-258-9026	F-1	18					
5355-01-315-4817	F-1	11					
5305-01-315-4844	F-1	14					
5920-01-315-4862	F-1	6					
4820-01-315-4873	F-1	1					
5920-01-315-8064	F-1	5					
5998-01-318-0665	F-1	38					
5998-01-318-0666	F-1	31					
5999-01-318-4367	F-1	26					
5999-01-318-4368	F-1	30					
5810-01-322-5167	F-1	36					
6130-01-324-0854	F-2	1					
5355-01-343-0390	F-1	3					
5999-01-351-9101	F-1	34					
5310-14-274-3481	F-2	5					
5935-14-396-1316	F-1	20					
5935-14-407-0306	F-1	19					
5310-14-418-9528	F-1	13					
5330-14-419-1533	F-3	10					
5330-14-419-1534	F-1	21A					
5310-14-419-1536	F-1	35C					
	F-2	2					
	F-3	9					
5305-14-419-1537	F-3	1					
5305-14-419-1538	F-3	5					

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CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
80058	BA-5372/U	6135-01-214-6441	F-1	10
F0110	E27115C30Q6CCT	5305-01-315-4844	F-1	14
F0110	E27620-30CCT	5310-14-418-9528	F-1	13
F0110	E27620-40CCT	5310-14-421-8313	F-3	2
25330	GC822-1	5340-01-258-9026	F-1	18
14933	HA39-16	5920-01-257-2882	F-1	7
96906	MS27502B11C	5935-01-026-2308	F-1	17
96906	MS27502B13C	5935-00-410-8504	F-1	15
96906	MS27502B15C	5935-00-487-8670	F-1	12
96906	MS27502B9C	5935-01-120-9246	F-1	16
F4305	SER343	5935-14-407-0306	F-1	19
F4305	SER344	5935-14-396-1316	F-1	20
F7377	U06145-00	5305-14-422-6912	F-2	6
F7377	U07095-00	5305-14-422-6911	F-1	35B
			F-2	3
			F-3	8
F7377	U07096-00	5305-14-419-1538	F-3	5
F7377	U07097-00	5310-14-419-1536	F-1	35C
			F-2	2
			F-3	9
F7377	U07290-00	5330-14-422-8678	F-1	9
F7377	U08115-00	5330-14-419-1534	F-1	21A
F7377	U08116-00	5330-14-422-6902	F-1	35A
F7377	U08117-00		F-2	4
F7377	U08118-00	5330-14-419-1533	F-3	10
F7377	U08234-00	5305-14-419-1537	F-3	1
67032	U08246-00		F-1	22
67032	U08247-00	6130-01-254-6692	F-1	27
67032	U08248-00		F-1	35
67032	U08249-00	5998-01-254-6709	F-1	41
67032	U08251-00	5998-01-254-6708	F-1	40
67032	U08253-00	5998-01-254-6707	F-1	39
67032	U08255-01	5998-01-318-0665	F-1	38
67032	U08260-00	5998-01-254-0816	F-1	37
67032	U08267-00	5998-01-254-6710	F-1	23
67032	U08269-00	5998-01-254-6712	F-1	25
67032	U08271-00	5998-01-254-6711	F-1	24
67032	U08273-01	5999-01-318-4367	F-1	26
67032	U08275-01	5998-01-318-0666	F-1	31
67032	U08277-02	5999-01-351-9101	F-1	34
67032	U08279-00	5998-01-254-6718	F-1	32
67032	U08281-00	5998-01-254-6719	F-1	33
67032	U08283-00	5998-01-254-6715	F-1	29
67032	U08285-00	5998-01-254-6714	F-1	28
67032	U08287-01	5999-01-318-4368	F-1	30
67032	U08289-00	5998-01-254-6721	F-2	7
67032	U08292-00	5998-01-254-6722	F-2	7
67032	U08295-01	6130-01-324-0854	F-2	1
67032	U08320-00	6130-01-254-6694	F-3	6
67032	U08327-00	6130-01-254-6693	F-3	4
67032	U08330-00	6130-01-255-4149	F-3	3

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
67032	U08332-00	6130-01-254-6695	F-3	7
F7377	U08631-00	5305-14-422-6916	F-3	12
F6495	U08660-03		F-1	21
F7377	U08662-01	5920-01-315-8064	F-1	5
F7377	U08662-02	5920-01-315-4862	F-1	6
F7377	U08662-03	5920-01-257-2881	F-1	4
F7377	U08665-01	5355-01-315-4817	F-1	11
67032	U08657-18	5355-01-343-0390	F-1	3
F7377	U10799-00	4820-01-315-4873	F-1	1
F6495	U11092-00		F-1	8
98230	0N409500-502	5810-01-322-5167	F-1	36
F0349	500401-80	5310-14-274-3481	F-2	5
F0349	864-030-70		F-3	11

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FIG.	ITEM	FIGURE AND ITEM NUMBER INDEX STOCK NUMBER	CAGEC	PART NUMBER
F-1	1	4820-01-315-4873	F7377	U10799-00
F-1	3	5355-01-343-0390	67032	U08657-18
F-1	4	5920-01-257-2881	F7377	U08662-03
F-1	5	5920-01-315-8064	F7377	U08662-01
F-1	6	5920-01-315-4862	F7377	U08662-02
F-1	7	5920-01-257-2882	14933	HA39-16
F-1	8		F6495	U11092-00
F-1	9	5330-14-422-8678	F7377	U07290-00
F-1	10	6135-01-214-6441	80058	BA-5372/U
F-1	11	5355-01-315-4817	F7377	U08665-01
F-1	12	5935-00-487-8670	96906	MS27502B15C
F-1	13	5310-14-418-9528	F0110	E27620-30CCT
F-1	14	5305-01-315-4844	F0110	E27115C30Q6CCT
F-1	15	5935-00-410-8504	96906	MS27502B13C
F-1	16	5935-01-120-9246	96906	MS27502B9C
F-1	17	5935-01-026-2308	96906	MS27502B11C
F-1	18	5340-01-258-9026	25330	GC822-1
F-1	19	5935-14-407-0306	F4305	SER343
F-1	20	5935-14-396-1316	F4305	SER344
F-1	21		F6495	U08660-03
F-1	21A	5330-14-419-1534	F7377	U08115-00
F-1	22		67032	U08246-00
F-1	23	5998-01-254-6710	67032	U08267-00
F-1	24	5998-01-254-6711	67032	U08271-00
F-1	25	5998-01-254-6712	67032	U08269-00
F-1	26	5999-01-318-4367	67032	U08273-01
F-1	27	6130-01-254-6692	67032	U08247-00
F-1	28	5998-01-254-6714	67032	U08285-00
F-1	29	5998-01-254-6715	67032	U08283-00
F-1	30	5999-01-318-4368	67032	U08287-01
F-1	31	5998-01-318-0666	67032	U08275-01
F-1	32	5998-01-254-6718	67032	U08279-00
F-1	33	5998-01-254-6719	67032	U08281-00
F-1	34	5999-01-351-9101	67032	U08277-02
F-1	35		67032	U08248-00
F-1	35A	5330-14-422-6902	F7377	U08116-00
F-1	35B	5305-14-422-6911	F7377	U07095-00
F-1	35C	5310-14-419-1536	F7377	U07097-00
F-1	36	5810-01-322-5167	98230	0N409500-502
F-1	37	5998-01-254-0816	67032	U08260-00
F-1	38	5998-01-318-0665	67032	U08255-01
F-1	39	5998-01-254-6707	67032	U08253-00
F-1	40	5998-01-254-6708	67032	U08251-00
F-1	41	5998-01-254-6709	67032	U08249-00
F-2	1	6130-01-324-0854	67032	U08295-01
F-2	2	5310-14-419-1536	F7377	U07097-00
F-2	3	5305-14-422-6911	F7377	U07095-00
F-2	4		F7377	U08117-00
F-2	5	5310-14-274-3481	F0349	500401-80
F-2	6	5305-14-422-6912	F7377	U06145-00
F-2	7	5998-01-254-6721	67032	U08289-00

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FIG.	ITEM	FIGURE AND ITEM STOCK NUMBER	NUMBER INDEX CAGEC	PART NUMBER
F-2	7	5998-01-254-6722	67032	U08292-00
F-3	1	5305-14-419-1537	F7377	U08234-00
F-3	2	5310-14-421-8313	F0110	E27620-40CCT
F-3	3	6130-01-255-4149	67032	U08330-00
F-3	4	6130-01-254-6693	67032	U08327-00
F-3	5	5305-14-419-1538	F7377	U07096-00
F-3	6	6130-01-254-6694	67032	U08320-00
F-3	7	6130-01-254-6695	67032	U08332-00
F-3	8	5305-14-422-6911	F7377	U07095-00
F-3	9	5310-14-419-1536	F7377	U07097-00
F-3	10	5330-14-419-1533	F7377	U08118-00
F-3	11		F0349	864-030-70
F-3	12	5305-14-422-6916	F7377	U08631-00

GLOSSARY

ac	Alternating current
BIT	Built-in test
BITE	Built-in test equipment
CCA	Circuit card assembly
COMSEC	Communications security
CPU	Central processing unit
dc	Direct current
DSVT	Digital secure voice terminal
GHz	GigaHertz
GLU	Group logic unit
GSE	Government supplied equipment
Hz	Hertz
HVA	High voltage assembly
IDS	Intermediate Direct Support
Kg	Kilogram
LED	Light emitting diode
MAC	Maintenance allocation chart
MCU	Mobile COMSEC unit
MHz	MegaHertz
MSRT	Mobile subscriber radio terminal
MWO	Modification work order
NCS	Node center switch
OCONUS	Outside continental U.S.
PMCS	Preventive maintenance checks and services
RPSTL	Repair parts and special tools list
TMDE	Test, measurement, and diagnostic equipment
TTL	Transistor-transistor level
RAU	Radio access unit
RF	Radio frequency
S02	Sulphur dioxide
UPS	Universal power supply
VHF	Very high frequency
CONUS	Continental U. S.
VCO	Voltage-controlled oscillator

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PUBLICATION DATE

23 Jan 74

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2-25	2-28		
3-10	3-3		3-1
5-6	5-8		
E-5			
E-8		E-3	
E-9			

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2⁰ IFF antenna lag rather than 1⁰.

REASON: Experience has shown that with only a 1⁰ lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2⁰ without degradation of operation.

Item 5, Function column Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

For item 2, change the NSN to read: 5835-00-134-9186.

REASON: Accuracy.

Identify the cover on the junction box (item no. 5).

REASON: It is a separate item and is not called out on figure 19.

Add the cover of the junction box as an item in the listing for figure 19.

REASON: Same as above.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SSG I. M. DeSpirito

999-1776

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1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Millimeter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

32 Fahrenheit is equivalent to 0 Celsius

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.0386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9(F - 32) = C
 212 Fahrenheit is equivalent to 100 Celsius
 90 Fahrenheit is equivalent to 32.2 Celsius

9/5 C + 32 = F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches.....	Centimeters.....	2.540
Feet.....	Meters.....	0.305
Yards.....	Meters.....	0.914
Miles.....	Kilometers.....	1.609
Square Inches.....	Square Centimeters.....	6.451
Square Feet.....	Square Meters.....	0.093
Square Yards.....	Square Meters.....	0.836
Square Miles.....	Square Kilometers.....	2.590
Acres.....	Square Hectometers.....	0.405
Cubic Feet.....	Cubic Meters.....	0.028
Cubic Yards.....	Cubic Meters.....	0.765
Fluid Ounces.....	Millimeters.....	29.573
Pints.....	Liters.....	0.473
Quarts.....	Liters.....	0.946
Gallons.....	Liters.....	3.785
Ounces.....	Grams.....	28.349
Pounds.....	Kilograms.....	0.454
Short Tons.....	Metric Tons.....	0.907
Pound-Feet.....	Newton-Meters.....	1.356
Pounds Per Square Inch.....	Kilopascals.....	6.895
Miles Per Gallon.....	Kilometers Per Liter.....	0.425
Miles Per Hour.....	Kilometers Per Hour.....	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters.....	Inches.....	0.394
Meters.....	Feet.....	3.280
Kilometers.....	Yards.....	0.621
Square Centimeters.....	Square Inches.....	0.155
Square Meters.....	Square Feet.....	10.764
Square Meters.....	Square Yards.....	1.196
Square Kilometers.....	Square Miles.....	0.386
Square Hectometers.....	Acres.....	2.471
Cubic Meters.....	Cubic Feet.....	35.315
Cubic Meters.....	Cubic Yards.....	1.308
Millimeters.....	Fluid Ounces.....	0.034
Liters.....	Pints.....	2.113
Liters.....	Quarts.....	1.057
Liters.....	Gallons.....	0.264
Grams.....	Ounces.....	0.035
Kilograms.....	Pounds.....	2.205
Metric Tons.....	Short Tons.....	1.102
Newton-Meters.....	Pound-Feet.....	0.738
Kilopascals.....	Pounds per Square Inch.....	0.145
Kilometers per Liter.....	Miles per Gallon.....	2.354
Kilometers per Hour.....	Miles per Hour.....	0.621

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